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A.M.A. SESSION • ATLANTIC CITY, N. J. • JUNE 7-11, 1937

NEW—"Bright's Disease"—by W. J. Stone

The great frequency of Bright's disease and the high mortality rate make this *new book* one of the most important we have published in a long time. It is a practical, clinical book, because Dr. Stone wrote it from *bedside notes* which he has been compiling for the past twenty years.

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ANTHRACOSILICOSIS

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AND
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WASHINGTON, D. C.

Most cases of silicosis are the result of inhaling dust that is not pure silica. An example is the disease caused by dust generated in the mining and processing of hard coal in Pennsylvania. The disease produced by this dust is termed anthracosilicosis and answers all the definition requirements of an occupational disease. Locally it is called "miners' asthma." It must, however, be differentiated from the pathologic state anthracosis, common among most city dwellers.

Our remarks are based on a recent medical, engineering and statistical study [1] by the Public Health Service of (*a*) practically all the personnel of three representative mines, numbering 2,711, (*b*) 135 apparently tuberculous-free, disabled former anthracite workers who were studied intensively in hospitals, and (*c*) limited observations on the disease as observed in a tuberculosis sanatorium of Pennsylvania. It is our intention to outline briefly certain aspects of medical interest in anthracosilicosis.

Approximately 150,000 [2] men were engaged in the anthracite industry of Pennsylvania in 1930, but various economic changes [3] in the past fifteen years have caused a rather wide dissemination of anthracite workers throughout the country. Definite cases of this migration have come to our attention. Their significance as related to differential diagnosis in other sections of the United States is obvious.

ETIOLOGY

Etiologic factors pertaining to the pneumoconioses in general are well known to those practicing industrial medicine. We shall merely touch on certain dust factors of special importance in anthracosilicosis. Our studies showed that the hazard varied in different operations, according to the dust concentration and its free silica content. Therefore, in order to have a proper appreciation of the pathogenesis of this pneumoconiosis, it is necessary to know variations of this factor.

The median size of the dust particles that the anthracite worker is likely to inhale is about 0.91 micron, or about the size of a pathogenic micrococcus.

As regards the free silica content of the dust, the workers were arrayed chiefly into three groups:

1. Regular miners, exposed to dust with a free silica content of from 3 to 4 per cent.
2. Workers in the haulage ways, exposed to dust with a free silica content of 13 per cent.
3. Rock tunnelers and muckers, exposed to 35 per cent free silica.

These figures are characteristic exposures but are not all inclusive because they do not take care of mixed exposures and of a number of other factors. For example, the summary table of exposures (table 1) shows that about 43 per cent of the workers are employed as miners, yet on statistical analysis some of these men had higher siliceous exposures than 4 per cent, thus bringing the proportion of miners exposed to a dust of low silica content down to 16 per cent.

Not all workers in a dusty trade are necessarily exposed to a dust hazard. For instance, 361 of the 2,711 active anthracite workers were exposed to less than 5,000,000 particles of dust per cubic foot of air and were used as controls in analysis of the data. As a concrete example of just how much dust the concentration of 5,000,000 represents, it has been found that municipal street cleaners are exposed to about this degree of dustiness. Nor has the Public Health Service in its various studies of workers in dusty trades [4] found significant pulmonary fibrosis in any trade in which the exposure was less than 5,000,000 particles of dust (less than 10 microns) per cubic foot of air. Furthermore, the engineering phase of the anthracite study revealed that various methods of dealing with the dust problem have been introduced into the industry. As an example, the dry breaker (building in which anthracite coal is graded for market) is almost passé. The etiologic factors just touched on emphasize the importance of an occupational history.

For the individual case a typical example of the method used to determine the patient's dust exposure is shown in table 2. The last occupation listed is his present job. The weighted average dust exposure in each job is multiplied by the number of years in that occupation. The sum of all these products, divided by years in the industry, gives a fairly accurate estimate of the man's average exposure.

COMPOSITION OF ANTHRACOSILICOTIC LUNGS

Thirty years ago Wainwright and Nichols [6] reported that, by analytic means then available, 33 per cent of the dried lungs of anthracite coal miners was foreign matter. In unexposed adults this percentage was only

From the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service.

Owing to lack of space, this article has been abbreviated for publication in THE JOURNAL. The complete article appears in the author's reprints.

Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 13, 1936.

1. Anthracosilicosis Among Hard Coal Miners, Bull. 221, U. S. P. H. S., Washington, D. C., 1936.
2. U. S. Bureau of Census.
3. Lubin, I.: The Absorption of the Unemployed by American Industry, Washington, D. C., Brookings Institute, July 1, 1929, vol. 1. U. S. Census, 1920 and 1930.
4. Public Health Bull. 208, "The Health of Workers in Dusty Trades," general statement and summary of conclusions.
6. Wainwright, J. M., and Nichols, H. J.: Anthracosis and Tuberculosis, Am. J. M. Sc. **130**: 403 (Sept.) 1905.

1 to 3. King,[7] McNally[8] and Boehme[9] report 0.14, 0.113 and 0.12 as the percentage of silica normally present in lungs. The total silica found in the lungs of anthracite workers in our study was between 1.20 and 1.86 per cent. These values approximate those found by others (table 3) examining lungs of workers who had been exposed to dust of hard coals.

TABLE 1.—*Summary of Occupational Dust Exposure of Workers in Three Representative Anthracite Coal Mines*

Section and Occupation	Number of Men Exposed at Time of Survey	Number of Samples	Dust Count, Millions of Particles per Cubic Foot of Air (Weighted Average)*
Underground Workers			
Cutting and loading:			
Contract miners and laborers	1,219	114	
Chamber mining	653	...	480
Breast (pitch)	204	...	203
Breast (scraper)	362	...	88
Breast (shaker)			55
Company miners	130	...	†
Chute loaders and starters	45	12	291
Shaker loaders	7	4	26
Scraper loaders	12	4	3.8
Scraper loaders engineer	31	‡	3.2
Opening work (dry process):			
Rock drillers	95	17	241
Rock loaders (muckers and slatemen)	35	2	531
Transportation:			
Motormen and others			
Mine 1	166	8	71
Mine 2	44	8	233§
Mine 3	69	13	3.1
Loader and driver bosses, stablemen and helpers	10	‡	6.9
Shaft, slope and plane workers, spraggers and couplers	91	...	...
Mine 1	..	7	25
Mines 2 and 3	..	2	3.1§
Other inside workers:			
Ventilation, timbering and hoisting water section	276	‡	6.9
Superintendents	36	‡	2.9
Workers Above Ground			
Preparation (breaker):			
Dumpers and plane tenders			
Dry breaker	2	2	71
Wet breakers	7	7	14
Platform men and chippers			
Dry breaker	7	2	69
Wet breakers	23	7	24
Jig tenders and cone attendants	15	6	11
Slate pickers			
Dry breaker	40	21	380
Wet breakers	17	5	6.9
Car loaders and others			
Dry breaker	8	2	22
Wet breakers	20	4	2.3
Other workers			
Dry breaker	13	‡	331
Wet breaker	49	2	2.0
All other workers above ground	386	34	2.9
Totals	2,853	283	

* With impinger, U. S. Public Health Service method.
† Dust exposure depends on type of work performed as given in detailed occupational history.
‡ Dust count obtained from samples used for other occupations of similar exposure.
§ Average includes other samples.

It is interesting to note in this connection that the majority of compensation awards for silicosis among coal miners in Great Britain[10] go to workers in the anthracite fields of South Wales. In Australia, Badham and Taylor[11] report that it is the coal of low hydrocarbon content which produces the most fibrosis. Most important and of more than passing interest is the fact that in those regions of the world where the coal approaches the consistency of Pennsylvania anthracite, namely Wales[12] and Australia,[11] the advanced pulmonary fibrosis encountered on autopsy closely resembles that observed in the Pennsylvania anthracite miner.

7. King, E. J.; Stanial, H., and Dolan, M.: Biochemistry of Silicic Acid: Presence of Silica in Tissues, Biochem. J. **27**: 1002-1006, 1933.
8. McNally, W. D.: Silicon Dioxide Content of Lungs in Health and Disease, J. A. M. A. **101**: 584-587 (Aug. 19) 1933.
9. Boehme, A.: Klin. Wchnschr. **3**: 1909 (Oct. 14) 1924.
10. Heffernan, Patrick: Industrialism and Tuberculosis, Tubercle **17**: 250 (March) 1936.
11. Badham, C., and Taylor, H. B.: 'Coal Miners' Lung, M. J. Australia **1**: 511-524 (April 29) 1933.

PATHOLOGY

On gross appearance anthracosilicotic lungs are a dark gray, firm on palpation and usually heavy. In early cases a fine, black linear net work is noted on the surface of the lungs. The pleura is involved to a degree corresponding somewhat to the amount of parenchymatous involvement. Usually, fusing of the interlobar pleurae and scattered tough fibrous adhesions are noted between the visceral and the parietal pleura. Varying degrees of emphysema are noted. On section, linear black markings and stellate, black fibrous nodules are noted throughout the lungs.

In more advanced cases considerable distortion in the lobes may be noted. There is more pleural involvement, and emphysematous blebs, often of large size, are present. The disseminated nodules tend to coalesce. The coalesced nodules on becoming confluent finally show up as large, black to gray areas of consolidation, which replace large areas of functioning lung (fig. 1) and tend to be predominantly subapical in location. These consolidations have been described by Cummins and Sladden[12] as cuirass-like sheaths and are usually as hard as a golf ball. The cut surfaces of these consolidated masses are blackened by the heavy impregnation of carbon (fig. 2). Occasional strands and whorls of gray connective tissue may be seen in the cuirass. Not infrequently a central area of black pasty, noncaseous necrosis, often with cavitation, is present. The lung tissue between the black masses in these advanced

TABLE 2.—*Method of Computing the Average Dust Exposure of Each Employee*

Employee's Occupation	Number of Years in Occupation	Average Dust Concentration, Millions of Particles per Cubic Foot of Air	Millions of Particle Years per Cubic Foot
Slate picker (dry breaker)	2	380	760
Patcher (dry mine)	2	71	142
Mule driver (dry mine)	3	71	213
Miners' laborer (chamber)	3	480	1,440
Miner (chamber mining)	15	480	7,200
Section foreman	5	7	35
Totals	30		9,790

$$\frac{\text{9,790 (millions of particle years per cu. ft.)}}{\text{30 (number of years)}} = \text{326 millions of particles per cubic foot}$$

TABLE 3.—*Total Silica and Ash Determinations on Lung Specimens from Coal Miners in Three Different Countries*[1]

Investigator	Coal Field	Percentage: Total Silica Minimum	Total Silica Maximum	Ash Minimum	Ash Maximum
U.S. Public Health Service[1]	Pennsylvania anthracite	1.20	1.85	5.03	10.40
Badham[11]	New South Wales	0.22	1.53	2.38	8.85
Cummins[12]	South Wales	0.42	4.28	4.40	12.42

cases may be congested, edematous or emphysematous. The bronchial walls are thickened and may show cylindric dilatation.[13]

Grossly, then, the anthracosilicotic lung is characterized pathologically by silicotic fibrosis, a deposition of

12. Cummins, S. L., and Sladden, A. F.: Coal Miners' Lung: An Investigation into the Anthracotic Lungs of Coal Miners in South Wales, J. Path. & Bact. **33**: 1095 (Oct.) 1930.
13. Norris, G. W., and Landis, H. R. M.: Diseases of the Chest and the Principles of Physical Diagnosis, Philadelphia, W. B. Saunders Company, 1924.

carbonaceous material, frequently in cuirass-like masses in the infraclavicular regions of the lungs, a proportionate degree of pleural reaction, compensatory emphysema, and chronic bronchitis or bronchiectasis.

Microscopically, black particles are present in the macrophages, but they are rarely seen free in the alveolar epithelial cells. Collections of "dust cells" are seen, however, in the perivascular and peribronchial

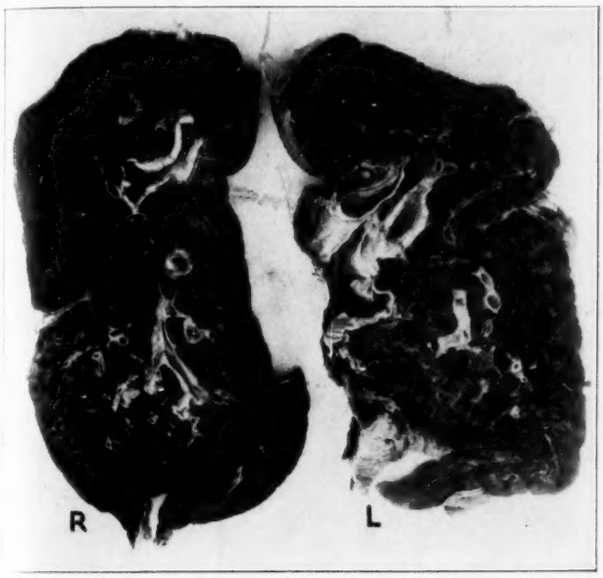

Fig. 1.—Anthracosilicotic lungs of a miner, aged 41, who had worked [illegible] years as a laborer at the face and fourteen years as a miner in a dry anthracite mine. Note the disseminated nodules identified by pigmentation and beginning to coalesce in the upper lobes of each lung.

lymphatics and adjacent interstitial tissue. Fibrous hyperplasia is observed quite early along the lymph channels and increases in certain areas to the formation of nodules. In the center of the smaller nodules, evidence of devascularization may be seen. The centers of larger nodules are for the most part well formed, white, fibrous connective tissue and commonly reveal evidence of hyaline degeneration but are often free of appreciable amounts of carbon. In the periphery of the nodules, dust-laden macrophages are present. Free extracellular dust is noted in large quantities in the adjacent underlying dense connective tissue (figs. 4 and 5).

As confluence of the nodules occurs, the peripheral coal dust deposits are enclosed in the larger nodule formed. Areas of central, amorphous, finely granular necrosis are often seen. Fibrous hyperplasia and dense depositions of coal dust are seen in the peritracheal and pulmonary lymph glands, often to such an extent that histology of the organ is completely obscured.

ROENTGENOLOGY

In the scheme of x-ray interpretations shown in figure 6 the progressive changes might be regarded as portraying the pathogenesis of the disease. In this scheme we have drawn freely from existing classifications of silicosis. The influence of Pancoast and Pendergrass,[14] Sampson[15] and the South African workers[16] is quite apparent. Pancoast and Pendergrass[14] in their studies of the pneumoconioses have shown that a close correlation exists between the x-ray examinations and the underlying pathologic changes.

Individuals who have had little or no exposure will show changes indicated as the linear phase in figure 6, and a summation of the changes would be interpreted as "usual fibrosis."

The increasing linear shadows are indicated by commencing generalized fibrosis representing, pathologically, fibrosis and engorgement. Fibrous hyperplasia is beginning in tracheobronchial lymph nodes, along the lymph channels and in the adjacent interstitial tissue. A case showing this appearance in the x-ray examination is a borderline case. The important characteristic of the x-ray picture is that it is still linear. Should removal from the dust exposure be effected, recession in the prominence of the pulmonic markings might be expected (fig. 7).

The next phase is exemplified by the x-ray film with a "ground glass appearance" and shown in figure 6 as the granular phase. Early in this phase a diminution in the prominence of the linear markings is noted, and later these markings are almost completely obliterated. It may be that pathologically the lymphatics are no longer engorged but are undergoing fibrosis, with more and more dust finding its way into the interstitial tissue of the lungs and being retained.

About the time obliteration of the linear markings becomes definitely apparent in the granular phase, an early degree of nodulation will usually be present.

Fig. 2.—Anthracosilicotic left lung. Note large indurated, fibrous mass, blackened by carbon, which has practically replaced all the functioning tissue of the whole upper lobe. Central portion of the mass shows noncaseous necrosis and early cavitation. Note smaller firm mass in upper portion of the lower lobe and numerous scattered nodular and diffuse pigmented fibrous masses, interspersed with emphysematous lung tissue throughout remainder of lung. Walls of bronchi and blood vessels thickened. Few scattered fibrous tags over pleura.

When nodulation becomes the predominant feature, the nodular phase has been reached. The nodules in this phase do not exceed 6 mm. in diameter[17] and

14. Pancoast, H. K., and Pendergrass, E. P.: Review of Pneumoconiosis: Further Roentgenological and Pathological Studies, Am. J. Roentgenol. **26:** 556 (Oct.) 1931.
15. Sampson, H. L.: Personal communication to the author.
16. "Silicosis," Records of the International Conference held at Johannesburg, Aug. 13-27, 1930, International Labor Office, Geneva.
17. Roentgenological Appearances in Silicosis and the Underlying Pathological Lesions, report of a committee composed of Drs. H. K. Pancoast, E. P. Pendergrass, A. R. Riddell and others, Pub. Health Rep. **50:** 989 (Aug. 2) 1935.

measure for the most part from 3 to 4 mm. There is some variation in the size of nodules encountered in x-ray films of this group, but in any one individual the nodules are fairly uniform in size unless infection is present. In this phase the hilar shadows are more dense than usual but not appreciably larger than those noted in the foregoing granular phase. In fact, in

Fig. 3.—Anthracosilicotic right lung (same case as figure 2). Note massive fibrosis blackened by carbon in upper lobes and the extreme degree of emphysema in lower lobe. An area of moderately emphysematous lung tissue is present at the apex.

certain cases one gains the impression that the hilus is smaller. Where the hilar shadows are larger or a gross disparity in their sizes on the two sides is noted, infection is suggested. In this phase vicarious emphysema becomes quite readily discernible.

The next phase is the conglomerate. In this phase definite coalescence of the nodules has occurred. We have already noted how, pathologically, this coalescence and confluence of nodules advance until all or the greater part of the upper lobes have been replaced by large masses of fibroid tissue containing entrapped coal dust. In such cases the basal portions of the lung show marked emphysematous changes, often manifest to a degree as large blebs or bullae (fig. 3).

An overlapping in the phases of pathogenesis has been shown because in the final interpretation of the film such features as fixation of the diaphragm, mediastinal distortion, childhood tuberculous lesions (Ghon's), early infraclavicular infiltrates and also certain clinical data must be considered. Some of this information, of course, is obtainable only by fluoroscopy.

The first signs of importance noted on fluoroscopy is a limitation (table 5) in diaphragmatic excursion, due presumably to loss of elasticity in the lungs and not necessarily to pleural reaction. Later, concomitant with the changes occurring in the lung parenchyma, the pleura shows proportionate involvement. Thus, diaphragmatic deformities such as peaking and obliteration of the costophrenic angles are frequently noted and in extreme cases lead to almost complete fixation of the diaphragm.

CLINICAL MANIFESTATIONS

The latent period of the disease, with the exception of rock workers, is approximately fifteen years, as less than 2 per cent of the workers developed the disease in this period of time.

It has already been stated that 2,711 active workers were examined. Of this number 616, or 22.7 per cent, were diagnosed as having anthracosilicosis. Examining almost all employees at the representative mines afforded us a sizable group of control individuals who were essentially of the same age, race and economic status. In the accompanying tables the examinations of the anthracosilicotic patients are compared with these controls and a group of 135 disabled ex-workers who were later examined. The large group of active workers (2,095) essentially negative for anthracosilicosis showed changes of about the same order as the controls.

Symptoms.—Apparently, the pathologic changes tend toward the production of rigid lungs. Clinically, therefore, the symptomatology is not unlike fibroid phthisis or, as Wainwright and Nichols [6] stated, essentially a chronic bronchitis and emphysema.

The cardinal symptom is dyspnea and is of a type that is singularly lacking in the orthopneic phenomenon. Like patients with fibroid tuberculosis, the individuals with well established anthracosilicosis are frequently

Fig. 4.—Section of anthracosilicotic lung. Note thickened pleura, underlying collection of carbonaceous material, massive diffuse fibrosis with engulfed carbonaceous material, and interlacing strands of nonpigmented white fibrous tissue. Reduced from a photomicrograph with a magnification of 16 diameters.

not sick enough to be bedridden, nor are they well enough to engage in activities requiring more than slight exertion. Cough is a frequent symptom and is usually productive of black viscid sputum. The bronchial pathologic condition probably explains this symp-

tom. Chest pain is common and is usually manifest as a substernal sense of restriction or a pleuritic pain in the lateral bases. Not infrequently the pain is aggravated by the cough, and this occurrence is readily appreciated when diaphragmatic fixation, mediastinal distortion and pleural reactions are considered. Weakness is a comparatively late symptom. Among the

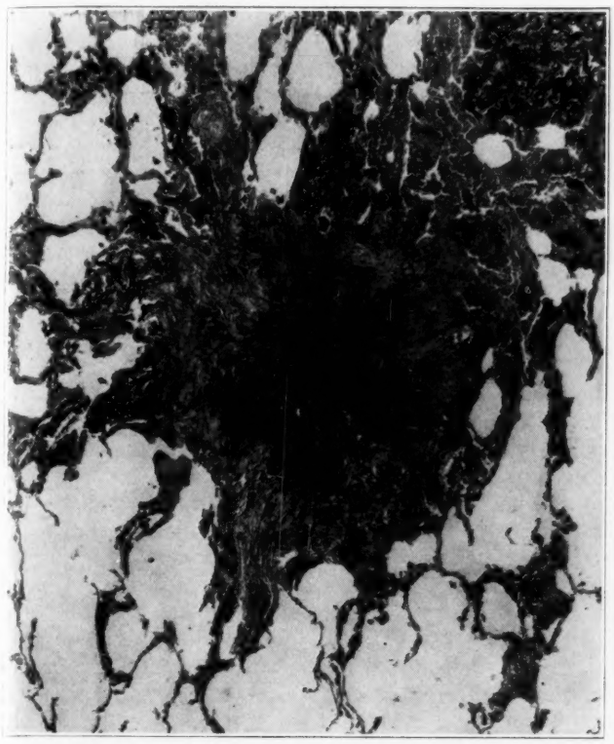

Fig. 5.—Small fibrous nodule showing entrapped coal dust. Reduced from a photomicrograph with a magnification of 80 diameters.

active workers it was offered as a complaint in 5 per cent of the early cases and in 14 per cent of the advanced cases. Hemoptysis may occur in the form of blood-streaked sputum as a result of an alveolar rupture, but its occurrence at any time is suggestive of tuberculosis. Night sweats and loss of weight also suggest complicating infection.

TABLE 4.—*Percentage Showing Various Symptoms by Diagnostic Group*

Symptom	Disabled Former Anthracite Worker	Active Workers with Anthracosilicosis		Control
		Advanced	Early	
Dyspnea	95.0	68.0	34.1	6.4
Cough	92.0	37.7	16.7	2.2
Weakness	82.0	14.1	4.7	0.8
Chest pain	36.0	17.0	5.9	1.7
Gastric distention	62.0	*	*	*
Hemoptysis	30.4	*	*	*
Night sweats	8.0	*	*	*
Number of men	135	106	510	361

* No comparable data.

The foregoing symptoms occurred at roughly twice the frequency among the complicated cases as in the cases not complicated by infection.

Signs.—The clinical signs vary with the pathologic changes. About the time the anthracosilicotic patient is beginning to show a break in his respiratory compensation, his general appearance is quite indicative of his physical status. There is a definite loss in the tonicity of the musculature of the upper arm, shoulder, neck and chest with the exception of those muscles actively engaged in the accessory respiratory function. Loss of weight is quite marked; the skin is frequently of a dusky pallor and the face has a weather-beaten appearance. This general appearance has been referred to as asthenic or cachexic (table 5). It was observed in 30 per cent of those in an advanced stage of the disease, in 97 per cent of the disabled, but in only 4 per cent of the controls.

Dyspnea as objectively observed is even more reliable and frequent than as subjectively noted. In early cases it often required the functional exercise test [18] to make it objectively discernible. The pulse and respiratory rate was taken at rest, immediately after and two minutes after the exercise. Obviously the response to this exercise is influenced by such factors as weight, age, cardiac condition, general physical condition and metabolism.

Another characteristic of the dyspnea is the prolongation of expiration. Its infrequency among controls indicates its importance in differential diagnosis. Because of the increased rigidity of the lungs and the accessory respiratory apparatus, the individual cannot empty his lungs rapidly enough to allow for great increase in respiratory rate. In the functional test the rate will usually be found elevated after the two minute rest period. Not infrequently this sign may be noted in well established cases merely by careful observation during the course of the medical examination.

Decreased chest expansion is a common sign, but a marked decrease is rarely encountered until the condition has progressed to a stage showing disability. The percussion note shows early bilateral impairment; later with consolidated and emphysematous areas in the lung it is respectively dull and hyperresonant. Fremitus is analogously altered. The breath sounds in early cases are bilaterally decreased, but with the formation of consolidations the breath sounds can be of

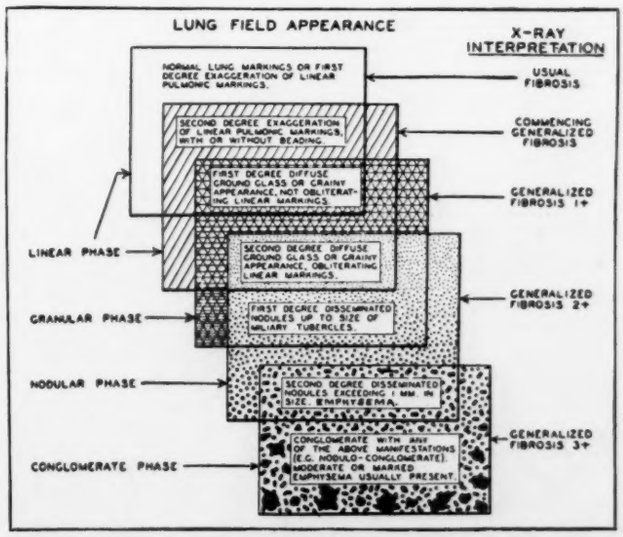
LUNG FIELD APPEARANCE
X-RAY INTERPRETATION
NORMAL LUNG MARKINGS OR FIRST DEGREE EXAGGERATION OF LINEAR PULMONIC MARKINGS.
USUAL FIBROSIS
SECOND DEGREE EXAGGERATION OF LINEAR PULMONIC MARKINGS, WITH OR WITHOUT BEADING.
COMMENCING GENERALIZED FIBROSIS
FIRST DEGREE DIFFUSE GROUND GLASS OR GRAINY APPEARANCE, NOT OBLITERATING LINEAR MARKINGS.
GENERALIZED FIBROSIS 1+
LINEAR PHASE
SECOND DEGREE DIFFUSE GROUND GLASS OR GRAINY APPEARANCE, OBLITERATING LINEAR MARKINGS.
GENERALIZED FIBROSIS 2+
GRANULAR PHASE
FIRST DEGREE DISSEMINATED NODULES UP TO SIZE OF MILIARY TUBERCLES.
NODULAR PHASE
SECOND DEGREE DISSEMINATED NODULES EXCEEDING 1 MM IN SIZE. EMPHYSEMA.
CONGLOMERATE WITH ANY OF THE ABOVE MANIFESTATIONS (E.G. NODULO-CONGLOMERATE). MODERATE OR MARKED EMPHYSEMA USUALLY PRESENT.
GENERALIZED FIBROSIS 3+
CONGLOMERATE PHASE

Fig. 6.—Scheme of x-ray interpretations. Asymmetrical distribution of shadows, unilateral increase of markings and less discrete or coalescing shadows (mottling) imply complicating pulmonary infection and modify any of the phases illustrated.

almost any character depending on the location and type of the underlying pathologic condition. Râles and rhonchi are common adventitious sounds in anthra-

18. Except when contraindicated, the test used was as follows: The individual places one foot on a chair or firm stand 18 inches in height and raises his body to the erect position twenty-five times in thirty seconds.

cosilicosis. Not infrequently they may be encountered in cases apparently not complicated by infection. They are usually located in the interscapular areas or the lateral bases below the upper third of the chest.

About one third of the affected individuals showed curved nails or early evidence of clubbing, which may be related to long standing fibrosis and bronchiectatic and emphysematous changes.

Cardiac enlargement and other cardiovascular defects were not observed to the extent that might have been expected. The higher prevalence in the disabled group suggests that it is a late complication.

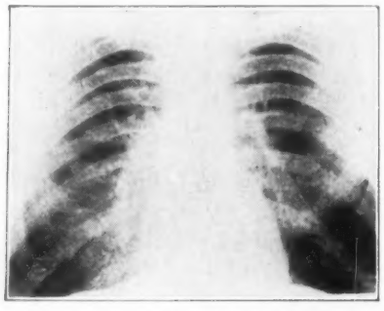

Fig. 7.—A miner, aged 40, had been engaged in the following occupations: butcher's apprentice and butcher, four years; lumberjack in the winter and laborer in paper mill in the summer, four years; press mill operator in copper mill, one year; outside laborer at anthracite mine, one year; miner's laborer, one year; contract miner, eleven years. The estimated weighted average dust exposure was 192 million particles per cubic foot. There were no complaints. The respiratory rate remained elevated after the exercise test. Note the bilateral, coarse, granular appearance of the lung fields with beginning nodular shadows. The linear markings are almost obliterated.

INFECTION AS A COMPLICATION

As in other forms of silicosis, tuberculosis is generally the complication that causes the most concern. Surveys indicate that the tuberculosis prevalence in the general population is from 1 to 2.5 per cent. With approximately the same diagnostic basis, the prevalence noted among the whole group of 2,711 active workers was 6 per cent.

On analysis this excess was found to be confined to those affected with anthracosilicosis because less than 1 per cent of the controls and about 2 per cent of all those negative for anthracosilicosis (2,095) had clinical tuberculosis. In the case of the affected workers, on the other hand, the percentage with clinical tuberculosis complicating the anthracosilicosis was 15 in the early cases and 43 in the advanced cases. A positive history of tuberculosis contact did not explain the higher frequency among those with anthracosilicosis.

When both tuberculous and nontuberculous infections were considered, it was found that 23.9 per cent of all active workers were affected. Such infections complicated 58 per cent of the early cases and 92 per cent of the late cases of anthracosilicosis.

In the 135 disabled, apparently tuberculous-free ex-workers so studied, all symptoms and signs were more universally present (table 4). Gastric distress was strikingly prominent in this group. About one third gave a history of hemoptysis. Only twelve (8.8 per cent) had fever, which ranged from 99.2 to 102.5 F. Night sweats were observed in only 8 per cent, yet thirteen (about 10 per cent) were shown to have positive sputums. These sputums contained acid-fast bacilli, which produced lesions of tuberculosis when injected into guinea-pigs. Although hemoptysis was recorded in 30 per cent, only five of those with positive sputum gave a history of spitting blood.

In comparing the clinical course of tuberculosis in cases with pneumoconiosis and those without pneumoconiosis, it was learned that in the pneumoconiotic shortness of breath is always an initial symptom, whereas in tuberculosis uncomplicated by pathologic conditions caused by dust it is a late secondary symptom. The pneumoconiotic cases showed less tendency toward cavity formation. Cough, chest pain and weight loss occur later in pneumoconiotic patients.

Thus it would seem that the relatively low febrile reaction, the proliferative rather than the exudative type of tuberculosis, the marked dyspnea and the gastric distress point to chronicity. Moreover, these observations on tuberculous infection among the disabled ex-workers closely parallel those of Williams [19] on old and retired Welsh coal miners.

TABLE 5.—*Percentage of Disabled Former Anthracite Workers, and of Employed Workers in the Industry Having Specified Physical Impairments as Compared with the Control Group*

Physical Changes	Anthracosilicotic Patients: Disabled Former Anthracite Workers	Anthracosilicotic Patients: Employed Workers in Advanced Stage	Anthracosilicotic Patients: Employed Workers in Early Stage	Control Group
Dyspnea (after functional exercise test)	100.0*	77.4	41.2	1.6
Asthenic or cachexic general appearance	97.0	30.2	11.6	4.0
Asthenic or emphysematous chest	74.8	52.0	25.0	8.7
Chest expansion (average in inches)	1.8	2.3	2.7	3.1
Impaired resonance	92.7	87.0	69.0	8.3
Changed breath sounds	95.0	92.0	85.0	26.5
Altered fremitus	87.0	92.0	85.0	7.0
Persistent râles:				
Crepitant	25.9	16.0	7.1	0.3
Subcrepitant	51.8	32.0	19.4	3.3
Sibilant	36.8	33.0	16.6	1.4
Sonorous	7.0	15.0	5.8	1.4
Prolonged expiration	†	42.4	18.2	0.6
Emphysema ‡	100.0	46.2	26.7	0.8
Enlarged heart	24.0	8.5	6.1	3.3
Clubbed or curved nails	76.7	30.2	29.0	4.1
Cyanosis	40.0	16.0	§	§
Impaired function of diaphragm ‡	96.3	88.0	76.5	17.2
Number of persons	135	106	510	361

* With or without exercise.
† Unable to exercise many; data not comparable.
‡ As determined by x-ray examination.
§ No comparable data.

On the basis of all clinical data in each case, the active workers (2,711) were classified according to disability as follows: none, slight, moderate or marked. Irrespective of the degree, about 63 per cent with anthracosilicosis showed evidence of disability, as compared with 9.7 per cent of the control group. This excess of disability might be assumed as attributable to the direct or indirect effects of dust. If slight disability for which the worker is able to compensate is disregarded, it was found that moderate and marked degrees handicapped 20.9 per cent of those with anthracosilicosis and only 1.7 per cent of the controls.

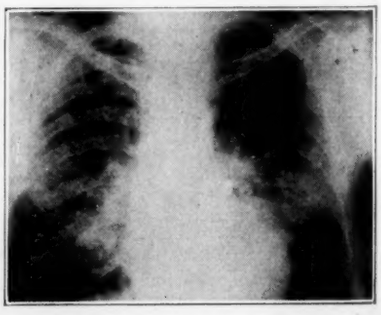

Fig. 8.—A miner, aged 52, had been a contract laborer seven years and a contract miner, twenty-six years (fourteen years in gangway work, and nineteen years at the breast). He had been a farmer before entering the mines. The estimated weighted average dust exposure was 323 million particles per cubic foot. Definite symptoms and signs were present. Note the symmetrical nodular shadows, beginning to coalesce, and emphysema.

SUMMARY

1. Anthracosilicosis (miners' asthma) is an occupational disease characterized by silicotic pulmonary

19. Williams, E. M.: The Health of Old and Retired Coal Miners in South Wales. Cardiff, Wales: University of Wales Press Board, Brit. M. J. 2: 389 (Aug. 26) 1933.

fibrosis, excessive retention of carbonaceous material and emphysema. Like other forms of silicosis, it renders the sufferer susceptible to tuberculosis late in life.

2. The chief subjective symptoms found in early cases of the disease are shortness of breath, cough and pain in the chest; later weakness, gastric distress and hemoptysis occur.

3. The most common objective symptoms observed are dyspnea, prolonged expiration, decreased expansion of the chest, curving or clubbing of the fingernails, changed breath sounds, altered fremitus and impaired resonance. In more advanced cases, or in cases complicated by infection, persistent râles and such constitutional impairments as loss of weight, cardiac defects and cyanosis are often noted.

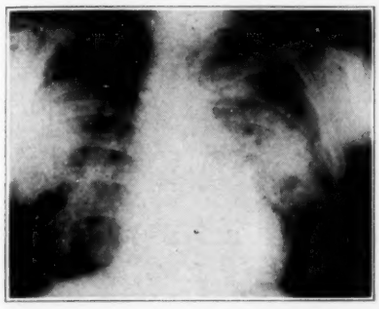

Fig. 9.—A miner, aged 55, had been a mine laborer in anthracite for three years, a contract miner for twenty-three years, and a company laborer for the past six years. The estimated weighted average dust exposure was 390 million particles per cubic foot. Symptoms and signs of well established anthacosilicosis were present. Note the conglomerate areas of fibrosis, emphysema and diaphragmatic deformity.

4. In a study of 2,711 active anthracite workers, including practically all the personnel of three representative anthracite mines, 616 (22.7 per cent) were found to be affected with anthracosilicosis.

5. The prevalence of clinical pulmonary tuberculosis in those with anthracosilicosis was 15 per cent in the early cases and 43 per cent in the late, well established cases. Among the controls and those essentially negative for anthracosilicosis, the prevalence was respectively 1 and 2 per cent, or about the same as in the general population.

Office of Industrial Hygiene and Sanitation Investigations.

ABSTRACT OF DISCUSSION

MR. P. W. GUMAER, West Englewood, N. J.: What are your lower limits and how does it compare with the smoky city atmosphere?

DR. R. R. SAYERS, Washington, D. C.: I believe that the number of particles would vary. It would be very great in the city, much more than the 360,000,000 particles per cubic foot as shown to the individual that he had on his table. Then the authors explained that 361 were used as controls. These were exposed to 5,000,000 particles or less. They also stated that this was about the equivalent of very dirty places found among the street sweepers in the city.

DR. W. C. DREESSEN, Washington, D. C.: In regard to smoky cities, I hardly believe we are on comparable ground. Smoke is somewhat different from industrial dust, particularly in its size distribution. In regard to the air pollution of cities, I believe the concentrations are very much lower than 5,000,000 particles of a size usually encountered in industrial plants.

DR. R. R. JONES, Washington, D. C.: There are some facts indicated in this paper which I would like to emphasize: first, the length of time required to develop this disease to the point at which such pulmonary disorder is revealed as was shown in the films presented. The patients had worked for many years, and with the exception of one discussed, all were still at work. This clearly shows that since anthracosilicosis develops slowly over a period of years, a positive diagnosis of the disease does not necessarily mean disability. Dr. Riddell of Canada in a recent article stressed a peculiarity of the dyspnea associated with silicosis, which we have also found true of the dyspnea associated with anthracosilicosis. It is this: Individuals with dyspnea resulting from true asthma or circulatory disturbances are orthopneic. They must be propped up in bed to be made comfortable, while the silicotic individual evidencing this symptom is not usually orthopneic—he is just as comfortable lying down as he is when sitting up. We hospitalized 135 patients with advanced anthracosilicosis, and this same peculiarity was shown by those with marked dyspnea. The only exceptions were those with cardiac complications.

DR. R. R. SAYERS, Washington, D. C.: Dr. Jones stated that it takes a long time for anthracosilicosis to develop. After fifteen years of exposure, only 2 per cent had the disease in the very early stage and without disability. But after twenty-five years and longer, 90 per cent of all exposed had the disease in some stage, some with disability. Exposure to underground conditions other than the exposure to dust did not predispose to respiratory diseases; as a matter of fact, men under these conditions had less respiratory disease than the general male population of the same age groups, while those exposed to dust and working underground had a much higher rate.

INTRAPROSTATIC INJECTION

AN EXPERIMENTAL STUDY

VINCENT J. O'CONOR, M.D.
AND
ROBERT L. LADD, M.D.
CHICAGO

In 1917 Cano, Townsend and Valentine [1] suggested direct medication of the infected prostate gland by perineal injection of a methyl phenol and a normal phenol serum. The method was not widely adopted

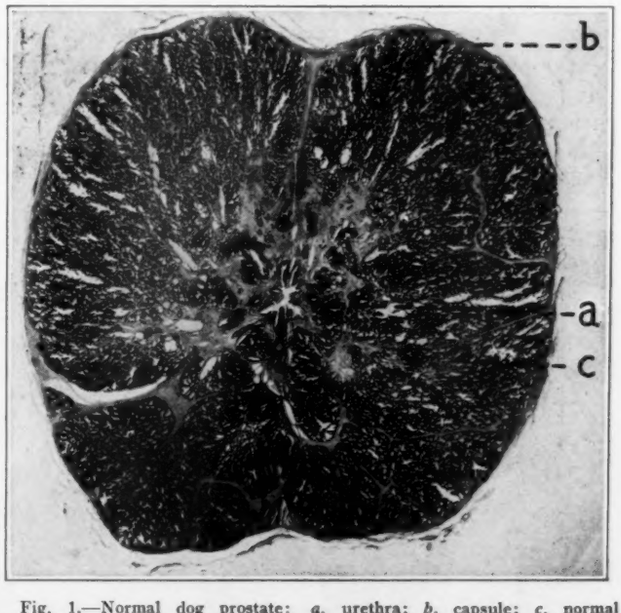

Fig. 1.—Normal dog prostate: *a*, urethra; *b*, capsule; *c*, normal glandular structure.

and scarcely any mention was made regarding this procedure until the recent publications by Grant.[2] McCarthy [3] in 1935 recommended direct intraprostatic

From the Laboratory of Surgical Research, University of Illinois College of Medicine.

Read before the Section on Urology at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 14, 1936.

1. Cano, F. G.; Townsend, T. M., and Valentine, J. J.: M. Rec. **91**: 715 (April 28) 1917.

2. Grant, Owsley: Treatment of Prostatitis by Injection, J. Urol. **29**: 749-753 (June) 1933; Treatment of Chronic Prostatitis by Injection, ibid. **33**: 631-638 (May) 1935.

3. McCarthy, J. F.: Recent Advances in Instrumental Urology, J. Urol. **33**: 303-309 (March) 1935.

injection through the panendoscope. Townsend [4] in 1936 reported further observations on intraprostatic injections.

Chronic prostatitis is a very frequent clinical condition which too often resists intelligent and diligent prolonged treatment. Any method, therefore, that can

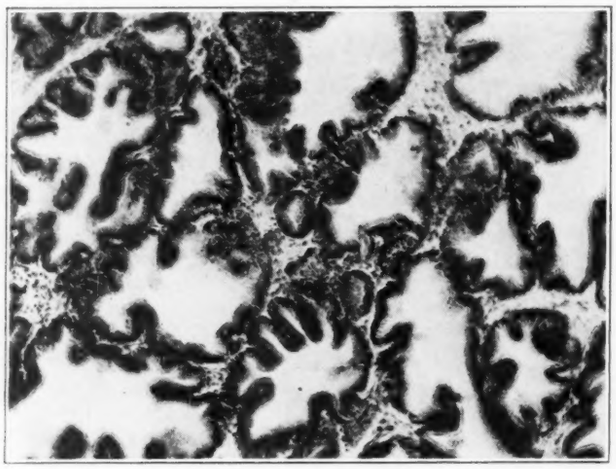

Fig. 2.—Normal dog prostate, showing the normal histologic appearance and glandular arrangement of dog prostate.

safely be applied to hasten the cure or shorten the course of this common ailment deserves careful consideration.

Grant [2] has injected from 10 to 20 cc. of 1 per cent aqueous solution of mercurochrome directly into the lobes of the prostate gland through a needle inserted perineally in more than 400 instances. He reports almost universal amelioration of symptoms and a rapidity of cure not usually obtained by other methods of treatment. He further states that this procedure has been carried out without a single untoward result in any instance.

McCarthy injected from 3 to 8 cc. of colloidal silver solution into each lateral lobe of the prostate through

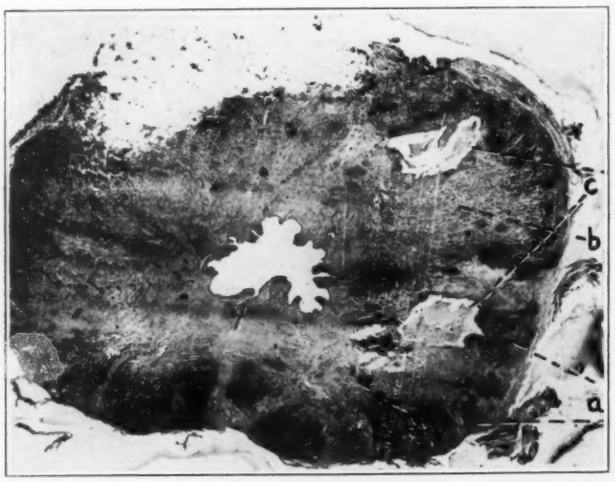

Fig. 3.—Dog prostate two weeks after injection of 2 cc. of 2 per cent mercurochrome: *a*, chronic inflammation; *b*, fibrous tissue; *c*, areas of necrosis. Marked glandular destruction, chronic inflammation and fibrosis.

the urethroscope. This procedure was carried out in each of forty patients on from three to seventeen occasions. He states that all but two of these patients reported definite improvement and sixteen were discharged as clinically cured.

4. Townsend, T. M.: Intraprostatic Injections, J. Urol. **35**: 75-82 (Jan.) 1936.

No mention is made in any published paper on the subject of intraprostatic injection of an attempt to determine what changes actually occur in normal prostatic tissue after it has been infiltrated with mercurochrome or colloidal silver. Grant merely states that at the outset of his work he "injected a few dogs' glands and they seemed none the worse." All exponents of this method seem to infer that the rationale of the procedure is based on the direct bactericidal effect of the injected solution for the organisms retained in the prostatic acini and ducts. Grant states that he does not attempt to say definitely how mercurochrome acts when injected into the prostate. It is his belief that "in this type of injection the mercurochrome acts with definite germicidal properties, and since it does remain in the gland for an extended period it prevents further bacterial growth. It does not seem likely that it acts in some obscure biological way as it does when injected intravenously. Indeed the entire basis of our hypothesis is the introduction of some antiseptic directly into the seat of inflammation in an endeavor to check that process by direct action."

Fig. 4.—Dog prostate two weeks after injection of 2 cc. of 2 per cent mercurochrome, showing marked glandular destruction and fibrosis.

Townsend states that substances injected into the prostate diffuse throughout the gland and that since substances so injected find their way into prostatic blood vessels, no medicament should be introduced into the gland that will not be tolerated by the general circulation.

This study was undertaken to determine the early and late tissue effects occurring in the prostate glands of dogs after direct injection. Our present report deals only with those injected with mercurochrome solution and colloidal silver solution, the substances recommended by Grant and McCarthy in their recent publications. The effects of other drugs are also being studied and will be given in a later publication.

TECHNIC

The prostate gland in fully grown dogs, being extravesicular, is easily isolated extraperitoneally in the postpubic space. An incision paralleling and slightly lateral

to the penis permits a muscle splitting incision and rapid exposure of the entire prostate without the necessity of any instruments or other traumatic application to the gland. Injection of the gland can be made under direct vision without disturbing any structures except a small amount of periprostatic fat on the

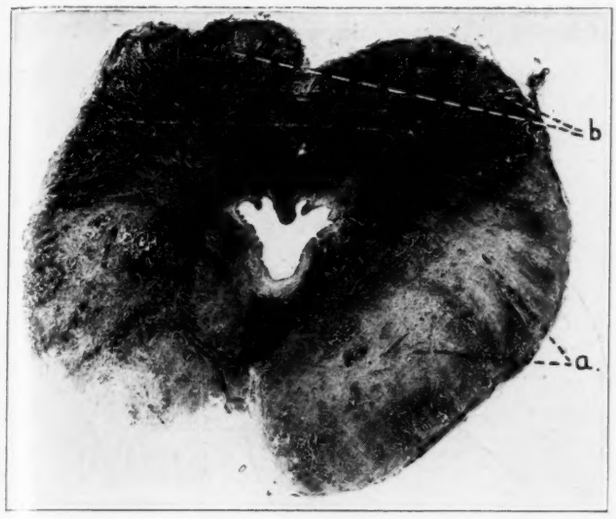

Fig. 5.—Dog prostate removed seven weeks after injection of 2 cc. of isotonic colloidal silver: *a*, marked fibrosis; *b*, areas of normal glandular tissue. Marked destruction of glandular tissue replaced by fibrous tissue with occasional areas of rather normal gland tissue.

superior surface. The prostate in well grown dogs is apparently from one-third to one-half the gross size of the adult human prostate, with the urethra traversing the central portion. In injecting the prostate great care was taken to avoid any trauma that might excite tissue changes not comparable to the procedure in the human being. A small needle was used and only two sites of injection were made, one on each side of the gland. Care was also taken to avoid anything that suggested overdistention of the gland and that might conceivably produce a pressure necrosis. On this account no injection exceeded 5 cc., while the average injection was 2 cc. (1 cc. on each side). That the drug diffuses readily throughout the gland is apparent on inspection. The needle was moved to include six areas in each instance, and the injection was made slowly. Very little or no leakage occurred from the prostatic capsule at the site of injection after the withdrawal of the needle. All operations were done under strict aseptic technic and under phenobarbital sodium anesthesia. Incisions were closed without drainage. Fourteen dogs were injected without a postoperative death, and convalescence was uneventful without febrile reaction or apparent difficulty in voiding. The dogs were killed at the required intervals and the entire prostate was removed en masse for gross and histologic study.

For the purpose of brevity the following general summary of the gross and microscopic changes found in the dogs' prostates, removed at varying periods after injection, is given rather than a detailed protocol in each instance.

PROTOCOLS

The prostate removed seven days after injection of 2 cc. of 2 per cent mercurochrome showed a gross adhesion of the periprostatic fat to a moderately thickened glandular capsule. These adhesions were strictly fibrous in character. The acini in some areas appeared to be totally destroyed, while in other areas there was only partial destruction. In some regions the acini were replaced by areas of hemorrhage, in others by cellular infiltration and in still others by fibrous tissue. Under higher magnification the partial or complete destruction of the acini was more apparent. The remaining lumens were filled with cellular débris, erythrocytes and small lymphocytes, plasma cells and histiocytes. The septums between the acini were thickened with dilated engorged capillaries and an infiltration by fibroblasts, small lymphocytes, histiocytes and plasma cells. In brief, then, these sections showed an active hyperemia, a scattered subacute inflammatory reaction with glandular destruction and an early fibroblastic proliferation.

The prostate removed fourteen days after the injection of 2 cc. of 2 per cent mercurochrome showed only slight gross adhesion of the periprostatic fat to the thickened glandular capsule. There was an almost complete destruction of the glandular structure. Some areas were of necrotic tissue, others showed cellular infiltration, and still others were replaced by fibrous tissue. Under higher magnification this marked glandular destruction associated with fibrous tissue replacement was seen more clearly. Thus the specimen fourteen days after injection showed merely a more advanced stage of the changes noted after seven days.

The prostate removed sixty-three days after injection of 2 cc. of 2 per cent mercurochrome showed grossly, and under low power magnification, similar but more advanced changes as compared with the glands removed seven and fourteen days after injection. Under high magnification there was partial or complete glandular destruction, a moderate and apparently decreasing cellular infiltration but a more marked fibroblastic proliferation.

INJECTIONS OF COLLOIDAL SILVER

The prostate removed fourteen days after injection of 2 cc. of isotonic solution of colloidal silver showed grossly a very marked destruction of all acini, with areas of necrosis, fibrosis and cellular infiltration. Higher magnification revealed cellular débris, the remnants of a necrotic acinus and marked cellular infiltration. Under still higher magnification these infiltrating cells consisted of small lymphocytes, plasma cells, fibroblasts and histiocytes. Here again was observed a diffuse destruction

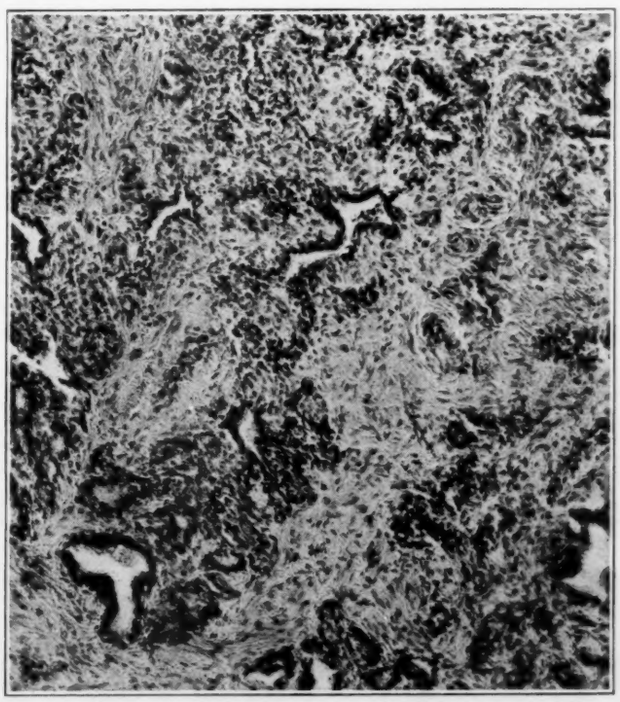

Fig. 6.—Dog prostate seven weeks after injection of 2 cc. of isotonic colloidal silver solution, showing marked glandular destruction and fibrosis.

of the glandular structure associated with a chronic inflammatory reaction and a beginning fibrosis of the gland as a whole.

The prostate removed forty-nine days after injection of 2 cc. of isotonic colloidal silver solution showed a more marked gross reaction in the gland amounting to an almost complete destruction of all acini, subsiding evidence of chronic inflammation and a dense fibrosis of the entire gland. Under higher magnification there were only scattered remnants of the gland surrounded by a fibrous tissue mass.

The prostate removed seventy days after injection of 1.5 cc. of nonisotonic colloidal silver presented marked glandular destruction with areas of necrosis, chronic inflammation and fibrosis. Higher magnification of a discrete inflammatory area showed partially destroyed acini, which were filled with small lymphocytes, plasma cells and histiocytes. The septums separating the acini were thickened and densely infiltrated with these cells. As might be expected, the inflammatory reaction after injection of nonisotonic colloidal silver was more prolonged and gave evidence of more severe reaction than in the case of the isotonic solution.

CONCLUSIONS

Intraprostatic injection in full grown dogs with solutions of mercurochrome and colloidal silver, causes chronic inflammatory reactions, scattered areas of necrosis and complete or partial destruction of the acini. Diffuse fibrosis of the gland occurs subsequently.

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ABSTRACT OF DISCUSSION

DR. EARL EWERT, Chicago: Drs. O'Conor and Ladd have portrayed graphically on postmortem specimens what must occur in man when chemicals are injected into the prostatic gland. The fibroblastic proliferation has persisted after sixty-three days, and this to our minds is one of the most important observations in this investigation. In other words, two months after the use of injected chemicals the resulting tissue reaction was still proceeding. On this basis I wonder whether the end result in some of these will not be a small, firm, scarred prostate, for instance, total sclerosis of the prostate with the rigid contracted bladder neck, and hence a fibrous median bar as a sequel. No doubt many of these patients with chronic prostatitis are doomed to this condition eventually, but I think that a certain percentage will be hastened years ahead of time. In 1931 I injected intraprostatically a filtered broth culture of the gonococci as had been done by previous workers. I was impressed by several facts. First, many infected prostates are harder than they feel. Hence diffusion of the injected material tends to remain in one site. The gland itself is small. This, then, tends to deposit much material in a smaller area, with accordingly a greater local tissue reaction, favorable or unfavorable. Second, the needles bend because of the hardness of the tissue, and hence the evident futility of massaging some of these glands. A more rational procedure seems to me to be that of G. J. Thompson and D. M. Davis of urethroscopic observation, the scalloping of the stenotic rigid ducts by the cutting loop and the Collings cutter. This provides drainage, and I have observed that the fibrosis proceeding in these glands may be stopped, with a resultant improvement in their symptoms. A chronically inflamed gland for many years has already a fibroblastic proliferation, with ducts that are stenotic and draining poorly, and I feel that this type of gland can better be handled by providing adequate drainage by the urethra. Perhaps Grant and his co-workers select their cases more carefully and eliminate the old scarred prostates with preprostatic infiltrations. I have not injected any prostates with mercurochrome or other chemicals, and I should like to know the results on these glands four or five years later.

DR. VINCENT J. O'CONOR, Chicago: We offer this paper before this section, where we feel it properly belongs, and, while we make no attempt to draw a clinical analysis, we wish to emphasize the importance of experimental control of a therapeutic procedure before it is recommended by urologists to the profession at large. It may be that the production of a certain amount of fibrosis in the large, boggy, chronically infected prostate is a good therapeutic procedure. From this experimental study it would seem that the beneficial clinical results credited to intraprostatic injection must be due to fibrotic obliteration of infected acini rather than to a localized sterilization of the injected tissues. These prostates in dogs were injected with a small amount of solution and yet the gross changes are severe and diffuse. These glands were normal and not infected at the time of injection, and I believe that all of us would approach such a procedure, using the solutions studied, with considerable deliberation and caution.

BONE GROWTH DISTURBANCE FOLLOWING HEMATOGENOUS ACUTE OSTEOMYELITIS

JOHN C. WILSON, M.D.
AND
FRANCIS M. McKEEVER, M.D.
LOS ANGELES

Medical literature of the past twenty years contains very little information relative to bone growth changes resulting from osteomyelitis in children. Speed [1] in 1922 called attention to the alteration in adolescent bones following pyogenic infection and made suggestions for their treatment. A review of sixty-four patients, with ninety individual foci of infection, who suffered from acute hematogenous osteomyelitis leads us to believe that disturbances in the conformation of bone are relatively frequent. An attempt has been made to determine: (1) the common variations in the contour of the long bones and the bones of the feet, (2) the relationship of the location of the focus of infection in the individual bone to the subsequent growth disturbances and (3) the bearing of the time of surgical drainage on disturbances of growth.

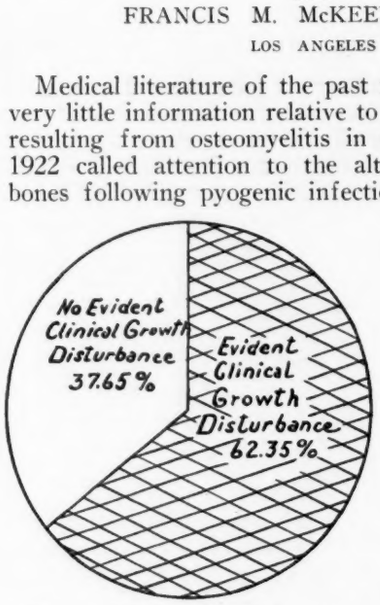

Fig. 4.—Percentage of total number of patients showing evident clinical growth disturbance.

The ninety foci of infection were distributed as follows: tibia thirty, femur twenty-nine, humerus ten, radius five, os calcis five, fibula three, metatarsals three, ulna two, phalanges two and clavicle one.

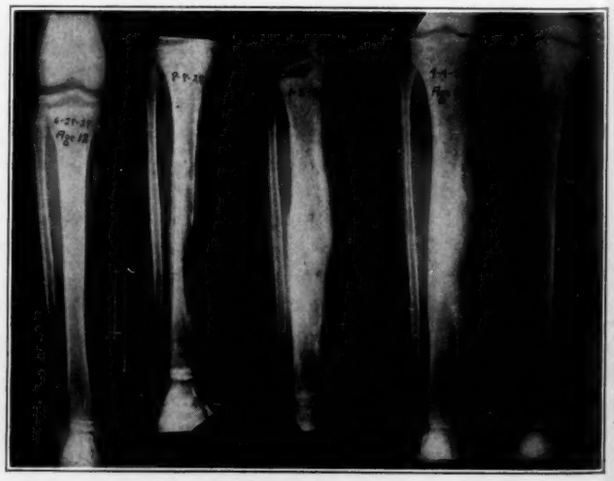

Fig. 6.—Perimetric hypertrophy, showing evidence of subperiosteal new bone at the end of the first three months. Perimetric hypertrophy limited by periosteal displacement. Note marked, but incomplete, reconstruction of shaft.

Infections of the vertebrae, scapula, ribs and bones of the pelvis have not been included. Accurate mea-

From the Orthopedic Department of Children's Hospital.
Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the authors' reprints.
Read before the Section on Orthopedic Surgery at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 14, 1936.

1. Speed, Kellogg: Surg., Gynec. & Obst. **34**: 469 (April) 1922.

surements of the amount of distortion were not possible. Osteomyelitis of the terminal phalanges was also excluded because the infection is by direct extension and not through the blood stream.

The individual bones comprising this study readily fall into two groups. The first one embraces the long bones with a diaphysis and one or more terminal epiphyses. There were fifty-nine cases in this group presenting eighty-five individual osteomyelitic infections. The second group includes five cases of hematogenous acute osteomyelitis of the os calcis. The os calcis grows by accretion and has no diaphysis or terminal epiphyses. The apophysis is comparable to the tibial tubercle and serves as a muscular attachment. The changes in contour of this bone are due to factors other than epiphyseal disturbance. The undeveloped but firmly attached periosteum of the os calcis influences the changes in shape that follow acute osteomyelitis.

AGE INCIDENCE

The onset of infection was in all cases prior to the twelfth year. The patients at the time of this report

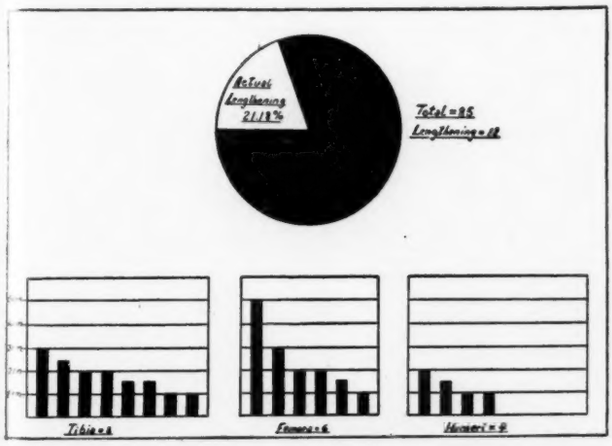

Fig. 7.—Total number of infections producing lengthening of bones with distribution as to individual bones and amount of lengthening.

were between 5 and 19 years of age. The largest group was between 13 and 19 years of age when they were last examined.

No patients were included in this survey who had not been observed for at least two years. One patient has been under observation for fourteen years.

CLASSIFICATION OF GROWTH DISTURBANCES

An attempt has been made to classify in a simple manner the changes that occurred in the long bones with one or more terminal epiphyses, as follows:

I. Primary variations:
  (*a*) Perimetric hypertrophy.
  (*b*) Lengthening.
  (*c*) Shortening.
  (*d*) Directional changes:
    (1) Coxa valga.
    (2) Bowing: anteroposterior and lateral.

II. Secondary variations:
  (*a*) Disturbance of joint inclination:
    (1) Genu valgum.
    (2) Medial deviation of the ankle.
    (3) Lateral deviation of the ankle.

III. Concomitant variations:
  (*a*) Compensatory lengthening of uninfected paralleling bones.
  (*b*) Shortening and diminution of size of feet without infection in any of the component osseous structures.

It is rather striking to note that perimetric hypertrophy followed all infections of the long bone in this group of patients. In eighteen of these patients the disturbance was slight, varying from 1 mm. to 2.5 mm., but nevertheless was always demonstrable by roentgen examination. This condition could not be detected in the femur by clinical examination because of the well developed muscle covering. On the other hand, a small degree of distortion in the tibia, because of its superficial location, was easily detected without the aid of x-ray examination. Thirty-two of eighty-five infected long bones, or 37.65 per cent, escaped without a disturbance in length or direction. In other words, fifty-three, or 62.35 per cent, of infected long bones had obvious deformity due to disturbance in growth, which was easily detected by clinical examination.

Fig. 8.—Tibia lengthened 2.5 cm. There is no disturbance of the ankle joint inclination because of compensatory lengthening of the fibula.

Of the thirty-two foci that recovered without a disturbance of growth, eighteen, or 56.28 per cent, were operated on late, after the tenth day of the infection, and fourteen, or 43.72 per cent, were operated on prior to the tenth day of the illness. This would seem to indicate that early drainage plays no part in the prevention of growth aberrations and, conversely, that deferring surgical intervention until the individual has an opportunity to localize the infection does not enhance the morbidity of growth disturbances.

PERIMETRIC HYPERTROPHY

A study of the roentgenograms of infected bones clearly indicates that perimetric hypertrophy is determined by periosteal displacement and is also limited by the extent of this displacement. A study of the roentgenograms in early stages of the disease will often

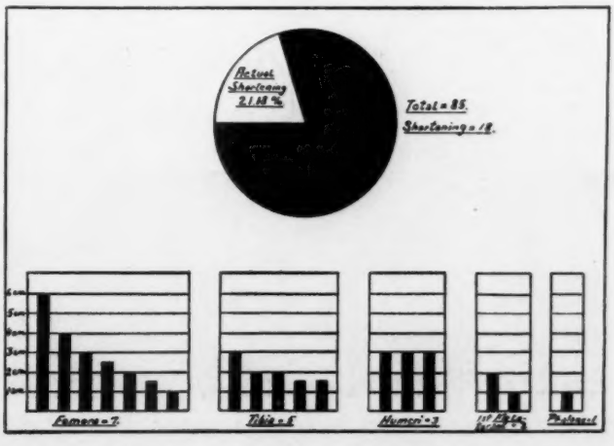

Fig. 9.—Total number of infections producing shortening of bones with distribution as to individual bones and amount of shortening.

reveal the extent of periosteal elevation and from this a prediction may be made regarding the extent of this perimetric hypertrophy. This increase in the transverse diameter of the long bones occurs very rapidly during the first three months and then gradually subsides. While the bone tends to resume its normal conformation, the subperiosteal new bone never entirely dis-

appears. It is also of interest to note that areas from which the periosteum has been resected show no evidence of perimetric thickening. It was also observed that perimetric hypertrophy does not occur to a great degree in centrally placed Brodie's abscesses. This is due to the fact that the inflammatory reaction is not of sufficient degree to cause marked stimulation of the bone producing power of the periosteum. In eighteen

Fig. 11.—Disproportionate bone growth of tibia and fibula due to premature closure of the distal tibial epiphysis. Mechanics of ankle joint markedly disturbed.

infections in which the perimetric hypertrophy did not exceed 0.25 cm. there was little if any periosteal reaction. The centrally placed limited foci are included in this group. In fifty-six of the infected bones the perimetric hypertrophy ranged from 0.5 to 1.5 cm. In these instances the periosteal reaction was plainly demonstrable by roentgenogram and varied in degree

Incidence of Moderate and Marked Degree of Perimetric Hypertrophy

Perimetric Hypertrophy	Lesions	Periosteal Reaction	Time		
			Drained Early	Drained Late	No Operation
0 to 0.25 cm.	20	None, many central abscesses	2	17	1
0.25 to 1.5 cm.	56	Moderate and marked	25	31	0
1.5 to 3 cm.	9	Always very marked	5	4	0
Os calcis. No perimetric hypertrophy	5	None	5	0	0

from moderate to marked. Perimetric hypertrophy was by actual measurement from 1.5 to 3 cm. in thickness in nine of the infected bones. This was classified as extreme.

Fig. 12.—*A*, early infection three weeks after onset in upper third of femur. *B*, thirteen months subsequent to infection: right trochanteric epiphysis closed with beginning coxa valga deformity; left trochanteric epiphysis not fused. *C*, trochanteric epiphysis closed nine years after onset of infection; permanent coxa valga deformity of right femur of marked degree.

The incidence of moderate and marked degree of perimetric hypertrophy was not materially decreased by early drainage of infected bones, as indicated in the accompanying table.

The periosteum of the os calcis is firmly adherent and is stripped with difficulty by edema or infectious exudate. Therefore, enlargement of the os calcis would not be anticipated because of the relationship that seems to exist between periosteal stripping and perimetric hypertrophy. The changes of contour in five cases of osteomyelitis of the os calcis were attributed to bone softening and muscle tension.

The activity of the periosteum in the production of new bone is of prime importance in the repair of defects due to sequestration and loss of substance through surgical intervention. These observations bespeak a word of warning to the surgeon and emphasize the importance of careful preservation of this important anatomic structure.

LENGTHENING

Eighteen of eighty-five infected long bones, or 21.18 per cent, showed an actual increase in the length of the bone involved.

The infection in all patients with bone lengthening was located in the diaphysis and not necessarily in juxtaposition to the epiphyses. In three instances of lengthening of the femur the infection in the shaft was located near the epiphysis of the trochanter major. As a result of the hyperemia caused by these foci the angle between the shaft and the neck of the femur was

Fig. 13.—Femur with marked anterior and lateral bowing associated with actual lengthening.

markedly distorted, causing a coxa valga deformity. This deformity was of course responsible in part for the actual lengthening of the femur. This was specifically so in the patient who exhibited 5 cm. of increased length of the leg.

Four of the eighteen patients with infections that produced lengthening of the long bones were operated on within ten days after the onset of the acute osteomyelitis. Drainage was instituted in fourteen at varying periods after the tenth day of the onset of the infection. We have been unable to discover any definite relationship between the time of drainage and the extent of disturbance when the infection is located within the diaphysis. An endeavor was made to correlate the time of drainage of the osteomyelitic infection with the extent of disturbance of bone growth. Our observations seem to indicate that the time of operation has no bearing on this later phase of the disease.

Elongation of the infected bone in an extremity in which there is a companion bone, such as the leg or the forearm, is associated with an actual lengthening of the uninvolved bone. It is also of interest to note that this increasing length of the infected bone produces a corresponding elongation of the uninfected bone without disturbing the mechanics of the joints formed by the articular extremities of the bones in question. The abnormal growth of the infected long

bone exerts a pulsion force which is distributed in such a manner that the longitudinal axis of the normal bone is not distorted.

SHORTENING

Eighteen of eighty-five infections, or 21.18 per cent, caused an actual decrease in the length of the involved bone.

The focus of osteomyelitis which caused interruption of growth was located in the diaphysis adjacent to the epiphyseal cartilage. X-ray examination showed the epiphyseal line to be interrupted, narrowed or prematurely closed at the periphery. The greatest amount of shortening, which was 6 cm., occurred in a femur in which the infection was complicated by a pathologic fracture. The shortening was due in part to a loss of substance at the point of fracture, but a considerable amount of shortening was nevertheless due to premature closure of the distal femoral epiphysis.

Five of eighteen infections, or 27.7 per cent, which caused shortening were drained within the first ten days. Thirteen, or 62.3 per cent, were drained later. This evidence is inconclusive but suggests that the time of drainage has little to do with the shortening.

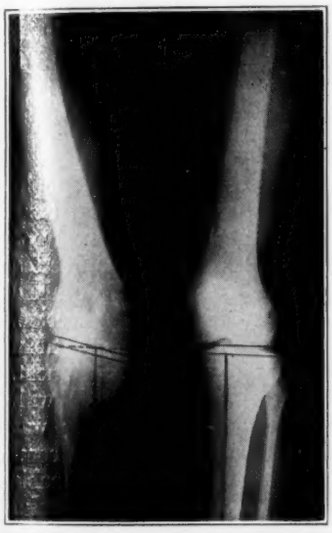

Fig. 14.—Knock knee deformity due to premature closure of the lateral half of the femoral epiphysis.

There were four small central lesions in the epiphyseal plate. These show at the present time roentgenologic evidence of excellent repair. Shortening or directional disturbance of the growth of bone did not ensue because of the fact that the infected areas did not encroach on the epiphyseal margins. Three of these foci of infection were located in the end of the radius and one in the lower end of the ulna.

The physiologic disturbance in the extremity supported by two bones is of course pronounced when infection occurs in one bone. The rate of growth of the uninjured bone is not retarded; in fact, in some cases growth seems to be accelerated. The rapidly growing uninfected bone acts as a pulsion force, bending the shortened infected bone. On the other hand the shortened infected bone acts as a bow string, or traction force, causing bending of the rapidly growing uninvolved bone. This condition was noted in the forearm and in the leg.

Under these circumstances the mechanics of the joint formed by the paralleling bones will be markedly altered, owing to medial or lateral tilting of the articular surfaces. This is particularly noted in the ankle joint. A disturbance corresponding to Madelung's deformity was seen at the wrist even though there was no tilting of the joint surface.

COXA VALGA

Growth of the upper end of the femur occurs at the capital and trochanteric epiphyses. In lower animals this is one epiphysis, but with the assumption of the upright position and the development of a well defined joint capsule a complete division occurs in the epiphyseal plate. This survey reveals that infections in the upper end of the femur which involve the trochanteric epiphysis, causing its premature closure, result in a coxa valga deformity of the neck of the femur. The reason for this is quite evident when one considers the fact that growth on the medial aspect of the neck of the femur will continue at a normal or accelerated rate

Fig. 15.—Knock knee deformity: *A*, due to medial bowing of the lower third of the femur; *B*, due to medial bowing of the upper third of the tibia.

while that on the outer aspect of the femur is retarded, owing to a disturbance in the trochanteric epiphysis. This coxa valga deformity will result in actual lengthening of the femur with concomitant pelvic tilt and scoliosis.

BOWING OF THE LONG BONES

Four patients were found to have definite anterior bowing in the lower third of the femur, and in one patient anterior bowing developed in the lower third of

Fig. 16.—Lateral deviation of ankle with disturbance of weight bearing due to growth disturbance in the lower tibial epiphysis.

the tibia. This deformity was quite marked and did not require roentgen examination for its detection. In two instances the femur showed an actual lengthening. The tibia was also elongated.

LATERAL BOWING

Slight degrees of medial and lateral bowing were frequently evident in the roentgenograms. This bowing was usually at the operative site and was not clinically

demonstrable. A few instances of medial bowing of single bones caused a knock knee deformity. Lateral bowing was observed twice in the bones of the forearm. While this bowing of the long bones is classified as a growth disturbance, it differs somewhat from those described in connection with epiphyseal disturbances. This bowing is, however, a definite clinical entity and is thought to be due to muscle pull on bones, which, because of infection, have lost some of their normal tensile strength.

GENU VALGUM

Knock knee deformity was present in ten cases as a result of infection involving the tibia or femur. It was observed that it develops either from a direct involvement of the epiphysis or from its unilateral stimulation. The stimulation of the medial half of the distal epiphysis of the femur will cause an overgrowth of the medial femoral condyle and a knock knee deformity. This was present in four patients. A retardation or premature closure of the lateral half of the distal femoral epiphysis will also cause a knock knee deformity. This creates an imbalance in growth so that the normal activity of the medial half of the epiphysis is sufficient to produce a knock knee deformity. This was found in one instance. Medial bowing of the lower third of the femur caused knock knee deformity in one instance because of the abnormal line of weight bearing. For the same reason, medial bowing of the upper third of the tibia caused a knock knee deformity in four patients. It also may be presumed

Fig. 17.—Distortion of os calcis due to compression without perimetric hypertrophy.

that a genu valgum deformity will result from a premature closure of the lateral aspect of the upper tibial epiphysis. It might also result from a stimulation of the medial half of the upper tibial epiphysis due to circumjacent infection. There was no instance of this distribution of infection in this series of cases. Lateral deviation of the ankle joint may follow as a result of a premature closure of the lateral half of the lower tibial epiphysis, as illustrated by figure 16.

OS CALCIS

The reaction of the os calcis to infection differs sufficiently from that of other bones to warrant special consideration. It was noticed that small abscesses may occur in the body of the os calcis and result in recovery without change in shape or consistency of the bone.

Perimetric hypertrophy does not follow hematogenous acute osteomyelitis of the os calcis because of the

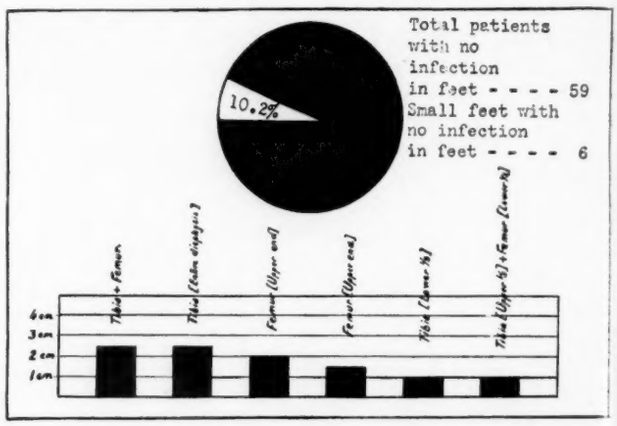

Fig. 19.—Graphic illustration of percentage of small feet without infections in bones of foot. Amount of shortening of feet with location of infection.

adherent periosteum. Infection of the calcaneal apophysis did not produce shortening of the infected bone or of the foot, but extensive infection of the body of the os calcis did cause shortening both of the infected bone and of the entire foot. This may be explained by the fact that growth of the os calcis is by accretion. The calcaneal apophysis is comparable to the tibial tubercle in that it serves only as a muscular attachment. The os calcis did exhibit a boat-like deformity with broadening despite the fact that weight bearing was excluded. This deformity is attributed to gradual compression of bone, softened by infection, which is unable to withstand normal muscle tension of the powerful gastrocnemius-soleus muscle group.

METATARSAL BONE AND PHALANGES

The metatarsal bones and phalanges show a great ability to regenerate and restore the normal contour. This is despite the fact that the osteomyelitic infection is associated with extensive destruction, sequestration and perimetric hypertrophy. Even though an epiphysis may be destroyed or the epiphyseal line of an individual metatarsal bone or phalanx fused at a premature time, the rate of growth of paralleling and contiguous bones is not changed. Directional disturbances are not produced. Shortening of the infected bone may follow, but this influences only the growth and development of the individual digit. There is perhaps one exception, and that pertains to extensive infection of the first metatarsal bone. Because of its location this may lead to some disturbance in contour of the medial border of the foot, causing faulty and painful weight bearing.

SMALL FEET

Decrease in the size of the foot was present in six of fifty-nine patients, or 10.2 per cent, despite the fact that the bony structure of the foot was entirely free from infection. Two instances of this growth disturbance followed a lesion of the tibia, one an extensive diaphyseal infection and the other in the lower third of the shaft. Small feet were found in two

instances in which a focus was located in both the tibia and the femur of the involved side. Two followed infections in the upper third of the femur. The difference in the size of the feet was sufficient in four instances to require special shoes.

The explanation of this disturbance of the growth of the foot is not clear. Patients in whom it occurred were not subjected to prolonged inactivity, and the extremities were not bound in plaster-of-paris dressings for unusually long periods. In fact, the term of splinting for some of the patients in whom small feet were found did not exceed eight weeks.

SUMMARY

Fifty-nine patients under 12 years of age with eighty-five individual foci of acute hematogenous osteomyelitis in long bones and five patients with acute hematogenous osteomyelitis of the os calcis were followed for periods of from two to fourteen years.

1. Fifty-three of eighty-five foci, or 62.35 per cent, caused growth disturbances that were obvious by clinical examination.

2. Perimetric hypertrophy was present in 100 per cent of infections in long bones.

3. Actual lengthening of long bones resulted in eighteen of eighty-five infections, or 21.18 per cent. The infections that resulted in lengthening were always located in the diaphysis and left the epiphyseal line undamaged.

4. Actual shortening of long bones resulted in eighteen of eighty-five, or 21.18 per cent. The infections that caused shortening in all instances were in the region of the epiphyseal line, and premature changes in the epiphyseal lines were evidenced by roentgenogram.

5. Infection in proximity to the trochanteric epiphysis of the femur causing premature closure of the epiphyseal line resulted in the occurrence of coxa valga deformity adequate to cause actual lengthening of the femur.

6. Anteroposterior, medial or lateral bowing due to muscle pull on bones decalcified by infection was common.

7. Disturbances of joint inclination with severe alteration of joint mechanics resulted from bowing of the long bones adjacent to the joint, or from stimulation or retardation of a portion of the epiphyseal zone of a bone entering into the formation of a joint.

8. Retardation of the growth of the entire foot resulted in six of fifty-nine patients, or 10.2 per cent, in whom the bones of the foot were entirely free of infection.

9. The metatarsal bones showed great ability to reconstruct their normal contour after severe disturbances. The adjacent metatarsal bones were not influenced by growth disturbance in their neighboring bones.

10. Perimetric hypertrophy did not occur in the os calcis. Compression and broadening of the os calcis followed extensive infections of the body and resulted from muscle tension.

11. Early operative intervention in this series of osteomyelitic infections did not decrease the frequency of growth disturbances.

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ABSTRACT OF DISCUSSION

DR. D. B. PHEMISTER, Chicago: It is well that the authors have called attention to this condition, because it has not received sufficient consideration. As they pointed out, the most important disturbance that arises is arrest of longitudinal growth of the shaft. That may be complete or partial. I want to call attention to the fact that partial destruction of the epiphyseal cartilage line may not result in arrested longitudinal growth. I have seen a few instances of osteomyelitis involving the metaphysis in which an abscess perforated the central portion of the cartilage into the epiphysis. Drainage of the abscess by decortication of the metaphyseal portion has in some cases resulted in healing without disturbance of longitudinal growth; but if the cartilage plate is destroyed at the periphery there is apt to be partial growth arrest with curvature and shortening of the bone. Growth arrest is relatively frequent at the upper end of the femur. If it is at the capital epiphysis and develops in young children there may be considerable upward growth of the greater trochanter; but in older children this is not the case. Osteomyelitis of the ilium may extend into and destroy the epiphysis of the bone along the sacro-iliac or hip joint, where it consists simply of a layer of articular cartilage. This results in growth arrest of the ilium with oblique contracture of the pelvis with elevation of the acetabulum. In the female there may be difficulty in labor from the pelvic deformity.

ACUTE HEMATOGENOUS OSTEOMYELITIS

AN ANALYSIS OF SEVENTY-FIVE CASES

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The essential pathologic condition in acute hematogenous osteomyelitis is a blood stream infection complicated by local infection of one or more bones. Within the past fifteen years the clinical trend has been toward early diagnosis and prompt surgical drainage of an increasingly conservative type. Diaphysectomy and tunneling have been largely replaced by drilling and removal of a cortical window at the earliest possible moment. Early drainage is advocated on the grounds that infection first occurs within the medulla, usually in the metaphyseal region, from which it follows the lines of least resistance, resulting in extensive necrosis and subsequent sequestration. This belief is supported by the clinical observations of

Fig. 1.—White girl, aged 13 years. Cortex drilled and window removed sixty hours following onset, under local anesthesia. Subperiosteal and subcortical abscess found. *A*, Nov. 2, 1933, one month after drainage. Localized area of destruction. *B*, March 12, 1935, thirty months after drainage. Bone well healed without sequestration. Wound healing time, two and one-half months.

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Starr [1] and the experimental work of Robertson [2] and Kistler.[3] By early drainage of the bone this destruction is thought to be prevented or minimized. On the other hand, Wilensky [4] contends that the pathologic condition follows embolism and thrombosis within some portion of the circulatory system of the bone.

Fig. 2.—White boy, aged 12 years. Cortex drilled and window removed five days following onset. Subperiosteal and subcortical abscess found. *A*, Oct. 3, 1932, five days following onset. Localized area of decreased density. *B*, Nov. 5, 1932, one month after drainage. Small sequestrum within sharply localized area of destruction. *C*, Aug. 31, 1934, twenty-two months after drainage. Bone well healed, with spontaneous extrusion of sequestrum. Wound healing time, twelve months.

He states that a fluctuant abscess is the only indication for surgery during the acute state, as early drainage does not remove the exciting cause, while by conservatism many operations are avoided.

Fig. 3.—White girl, aged 2 years, Sept. 5, 1934, four months after drainage of hip. Symptoms of sixty-four hours' duration. Site of infection, ilium. Streptococcus recovered from blood and wound. No sequestration. Wound healing time, two months.

The objectives of treatment are the saving of life and limb and the healing of the infected bone with minimum delay. Healing without sequestration is the result to be desired. Published series report a widely varying mortality rate of from 1.5 to 26 per cent, averaging about 12 per cent. Although the statement is made by many authors that early operation results in healing without sequestration, no report of a series recording such results has been found. Reports of series analyzing mortality, sequestration and healing time should be of value in determining the clinical merits of early and late surgical drainage.

In this series of seventy-five successive, unselected, private and clinical cases that I have treated within the past nine years, only definitely acute, hematogenous, pyogenic cases are included. While it is believed that the pathologic condition present is the true criterion of acuteness rather than the duration of the disease, it was found necessary to select some time limit in determining acuity. Twenty-two days was arbitrarily chosen, as all cases that could be considered acute from a pathologic and clinical point of view fell within this limit. To minimize the possibility of including cases of primary and extension types, the small bones of the hand and foot and the mandible were excluded. The principle

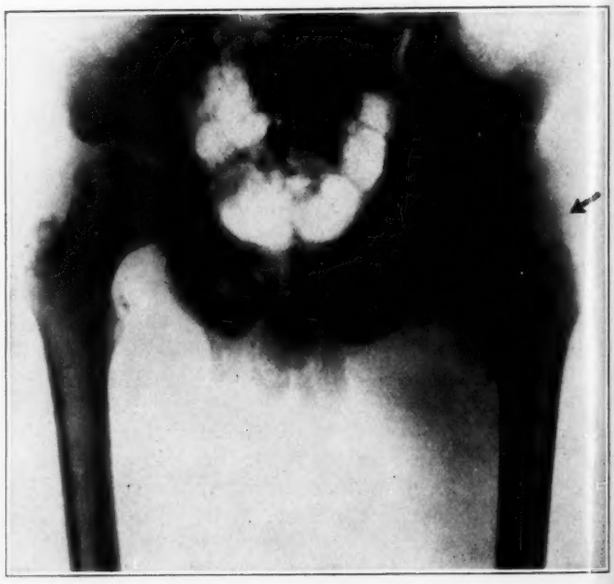

Fig. 4.—White boy, aged 8 years, June 4, 1932, three weeks after drainage of hip. Symptoms of seven days' duration. Site of infection, femoral neck. No growth recovered from blood or wound. No sequestration. Wound healing time, two months.

of early drainage was followed in all. A follow up of from six months to eight years has been obtained in each case. The cases comprising the series are divided on the basis of results into four groups.

In the series 61.3 per cent were males. Although all ages are represented, 72 per cent of the cases occurred between the ages of 5 and 15 years.

The average yearly admission to the general hospital (Baroness Erlanger) is 6,242, of which 26.3 per cent is Negro. The average yearly admission to the Children's Hospital is 1,062, of which 17.4 per cent is Negro. Both hospitals are operated by the city and county and have proportionately large charity services. It is felt that the small ratio of Negroes in this series (6⅔ per cent) indicates a relative racial immunity in this section.

Definite predisposing infection was not found in 45.3 per cent and definite predisposing trauma was considered absent in 62.6 per cent. In the group considered definitely traumatic is included a fracture-epiphyseal separation of the proximal end of the humerus in a Negro boy aged 15 years. Two days

1. Starr, C. L.: Acute Hematogenous Osteomyelitis, Arch. Surg. **4**: 567-587 (May) 1922.
2. Robertson, D. E.: Acute Hematogenous Osteomyelitis, J. Bone & Joint Surg. **9**: 8-23 (Jan.) 1927.
3. Kistler, G. H.: Sequences of Experimental Bacterial Infection of the Femur in Rabbits, Surg., Gynec. & Obst. **60**: 913-925 (May) 1935.
4. Wilensky, A. O.: Osteomyelitis, Its Pathogenesis, Symptomatology and Treatment, New York, Macmillan Company, 1934.

following the fracture, symptoms of acute local infection appeared. Fracture and epiphyseal separation preceding the onset of acute symptoms have been mentioned by Rose and Carless,[5] Robertson[2] and Beekman.[6]

The distal end of the femur or the proximal end of the tibia was involved in 45.3 per cent. This combination has been previously noted and is considered by Beekman[6] to be the result of frequent epiphyseal strains in this area. Involvement of two bones was found in 4 per cent of the group on admission to the hospital.

TABLE 1—*Sex, Age, Race and Predisposing Factors*

	I No Sequestration (19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (42 Cases)	IV Deaths (8 Cases)	Total (75 Cases)
1. Sex					
Males	13	5	24	4	46
Females	6	1	18	4	29
2. Age	6 wks.-64 yrs.	10 yrs.-15 yrs.	2.5 yrs.-21 yrs.	9 mos.-45 yrs.	
Under 2 yrs.	3	..	..	1	4
2- 5 yrs.	2	..	2	1	5
5-10 yrs.	6	..	23	2	31
10-15 yrs.	3	6	11	3	23
15-20 yrs.	..	..	5	..	5
20-25 yrs.	..	..	1	..	1
25-30 yrs.	1	..	..	..	1
30-35 yrs.	1	..	..	..	1
35-40 yrs.	..	..	..	..	..
40-45 yrs.	2	..	..	..	2
45-50 yrs.	..	..	..	1	1
50-55 yrs.	..	..	..	..	..
55-60 yrs.	..	..	..	..	..
60-65 yrs.	1	..	..	..	1
Average	15.6 yrs.	11.5 yrs.	9.2 yrs.	12.2 yrs.	10.1 yrs.
3. Race					
White	18	6	38	8	70
Negro	1	..	4	..	5
4. Predisposing factors					
Infection					
None found	6	4	21	3	34
Superficial	7	1	10	2	20
Head	4	..	7	2	13
Respiratory	..	..	2	1	3
Genito-urinary	..	..	2	..	2
Two or more	2	1	..	..	3
Trauma					
None	12	3	25	7	47
Considered definite	7	3	17	1	28

Pathologic dislocation of the hip was present in a girl 10 months of age with involvement of the femoral neck of twenty-two days' duration. A soft tissue abscess was present. Shelf operation was performed two years after onset without exacerbation.

A staphylococcus was found singly in 69.3 per cent of wounds and in combination with a streptococcus in one additional case. It occurred singly in 24 per cent of blood cultures and in combination with a streptococcus in one additional case.

Striking contrast between the groups occurs in physical and roentgen examinations. Pain on firm local bone pressure was the predominant finding in 63.1 per cent in group I and in 4.7 per cent in group III, while fluctuation was found in 31.5 per cent (one half of whom were under 2 years of age) in group I and in 71.4 per cent in group III. Groups II and IV were more evenly divided.

Roentgenograms were considered negative in group I in 84.2 per cent, while in group III only 7.6 per cent were so interpreted. Early roentgen changes were seen in 66⅔ per cent of group II and in 25 per cent of group IV as early as the fifth day and were absent as late as the fourteenth day following onset in one case.

The average duration of symptoms in group I was materially less than in group IV and was approximately half that of groups II and III. The average duration in infants under 2 years of age in group I was nearly one-third greater than any other group.

In four cases, diagnosis was not considered definite on the first examination. Traction, local heat or aspiration was utilized on admission and surgical drainage deferred until the diagnosis was considered definite.

The type of drainage employed in seventy-six operations on the seventy-five patients during the acute state varied widely with the individual case. Soft tissue abscesses when present were drained and the underlying bone was not opened. Subperiosteal abscesses were incised, the underlying cortex was drilled and a cortical window was removed. When subperiosteal pus was not found the cortex was drilled, and in six of seven such cases a window was also removed. In the seventh, only drilling was performed. Repeated joint aspiration without lavage was attempted in six cases. In one it was successful; in the others subsequent surgical drainage, in one case as late as the twenty-second hospital day, was considered necessary. When associated bone and joint disorder was found, the pathologic condition of the bone was treated on the foregoing principles, and the joint was incised only if definitely purulent material was obtained on aspiration.

TABLE 2.—*Classification of Bone Involved*

	I No Sequestration (19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (42 Cases)	IV Deaths (8 Cases)	Total (75 Cases)
5. Bone involved					
Tibia	..	..	..	..	(29)
Proximal end	3	..	11	2	16
Shaft	1	..	..	..	1
Distal end	1	1	10	..	12
Femur	..	..	..	..	(24)
Head	1	..	..	..	1
Neck	3	..	..	1	4
Trochanter	1	..	..	..	1
Distal end	4	3	10	1	18
Humerus					
Proximal end	..	2	7	..	9
Distal end	..	..	..	..	..
Ilium	..	..	..	..	(4)
Acetabular portion	3	..	..	..	3
Anterior superior spine	..	..	1	..	1
Ulna					
Proximal end	1	..	2	..	3
Distal end	..	..	..	..	..
"Hip" (Exact site undetermined, early death)	..	..	..	2	2
Os calcis	..	..	1	..	1
Multiple (simultaneous)	..	..	..	..	(3)
Femur distal end and radius distal end	..	..	..	1	1
Tibia proximal end and mandible	..	..	..	1	1
Tibia distal end and fibula distal end	1	..	..	..	1

In three patients, aged 40, 27 and 13 years, drainage was performed under local anesthesia. In the two adults (one a physician) the tibia was involved with symptoms of twenty-two and forty-eight hours' duration respectively. Subperiosteal exposure of the bone at the site of localized tenderness gave no relief. When the cortex was drilled at this level, both voluntarily stated that immediate local relief was obtained. No gross pus was found in either, but culture of the medulla was positive in both cases. In the child the

5. Rose, William, and Carless, Albert: Manual of Surgery for Students and Practitioners, ed. 10, New York, William Wood & Co., 1922.
6. Beekman, Fenwick: Acute Hematogenous Osteomyelitis: The Relationship of Its Pathology to Prognosis and Treatment, Ann. Surg. 88: 270-296 (Aug.) 1928.

distal end of the femur was involved with symptoms of sixty hours' duration. A subperiosteal abscess was incised without relief of pain. The cortex was drilled, with release of pus under pressure, and marked immediate relief was obtained. Culture from the wound was positive. A cortical window was removed

TABLE 3.—*Complications, Bacteriology and Diagnosis*

	I No Sequestration (19 Cases)		II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)		III Sequestration Requiring Surgery (42 Cases)		IV Deaths (8 Cases)		Total (75 Cases)	
6. Bone complications on admission (adjacent joint pathology omitted)										
Epiphyseal separation (distal end of femur)	..		..		3		..		3	
Pathologic dislocation (hip)	1*		..		..		..		1	
	Blood	Wound	Blood	Wound	Blood	Wound	Blood	Wound	Blood	Wound
7. Bacteriology										
Not on record	5	..	5	2	19	5	..	..	29	7
No growth	11	7	1	..	11	..	2	..	25	7
Staphylococcus albus	1	3	..	2	7	11	3	3	11	19
Staphylococcus aureus	..	1	..	2	5	16	1	2	6	21
Streptococcus nonhaemolyticus	1	4	..	..	..	..	..	..	1	4
Streptococcus haemolyticus	1	2	..	..	..	..	..	..	1	2
"Staphylococcus"	..	2	..	..	..	9	..	..	..	11
Staphylococcus aureus haemolyticus	..	..	..	..	..	..	1	1	1	1
Pneumococcus	..	..	..	..	..	..	..	1	..	1
B. pyocyaneus	..	..	..	..	..	..	..	1	..	1
"Streptococcus and staphylococcus"	..	..	..	..	..	1	..	..	..	1
Staphylococcus aureus and Streptococcus haemolyticus	..	..	..	..	..	..	1	..	1	..
8. Diagnosis										
History										
Initial symptom, systemic (fever, chill or headache)	3		..		5		4		12	
Initial symptom, Local (pain)	13		6		37		4		60	
Initial symptom masked by concurrent disease	3		..		..		..		3	
Physical finding, local (predominant)										
Fluctuation (soft tissue or joint)	6 (3*)		3		30		3		42	
Swelling and hyperemia	1		3		10		..		14	
Localized pain on pressure	12		..		2		5		19	
Initial roentgenograms										
Positive	3		4		39		2		48	
Negative	16		2		3		5		26	
Not made	..		..		..		1		1	

* Patients under 2 years of age.

in each case following drilling. These few experiences were so striking that cortical drainage has subsequently been performed as a routine except in the face of soft tissue abscess. Postoperative treatment in all cases of this series was by the Orr method or a slight modification.

In group I 68.4 per cent of the cases presented evidence of joint infection, in contrast to 2.3 per cent in group III and 37.5 per cent in group IV. It is considered probable that this complication, with its initial severity of local symptoms, facilitated early diagnosis and hospitalization in contrast to the cases in which it was absent.

A man, aged 43, with involvement of the femoral head and a woman, aged 64, with involvement of the tibia and fibula in the distal ends are atypical in that the acute symptoms apparently arose from activation of a low grade lesion of Brodie's type following trauma, although no previous history of local pain could be obtained. In all cases in which a subperiosteal abscess was found, the underlying bone showed gross pus when opened.

Beekman [6] reports two acute cases of the tibia with involvement of both ends of the bone and normal medulla intervening and considers both lesions of probable hematogenous origin. One similar case likewise involving the tibia was found in this series necessitating a second drainage of the opposite end of the bone. At subsequent sequestrectomy long sequestrums were found in each end of the bone with

TABLE 4.—*Duration of Symptoms Previous to Operation*

	I No Sequestration (19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (42 Cases)	IV Deaths (8 Cases)	Total (75 Cases)
9. Duration of symptoms at time of operation					
Under 48 hours	3	..	..	..	3
2- 4 days	8	..	5	3	16
5- 7 days	3	1	5	3	12
8-10 days	2 (1*)	1	9	..	12
11-13 days	1†	2	10	..	13
14-16 days	..	1	2	2 (1*)	5
17-19 days	1*	1	7	..	9
20-22 days	1*	..	4	..	5
Average					
Under 2 years	15.6 days	..	..	9.0 days	13.5 days
All others	4.3 days	11.8 days	11.5 days	6.8 days	8.9 days
Group	6.0 days	11.8 days	11.5 days	6.8 days	9.6 days

* Under 2 years of age.
† Subsequent amputation.

TABLE 5.—*Treatment*

	I No Sequestration (19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (42 Cases)	IV Deaths (8 Cases)	Total (75 Cases)
10. Treatment (initial local)					
Time					
Immediate drainage	15	6	42	8	71
Preoperative observation (8-24 hrs.)	4	..	..	..	4
Type					
Abscess incised	3	4	34	4	45
Abscess incised, cortex drilled and window removed	..	2	7*	..	9
Cortex drilled and window removed	3	..	1*	2	6
Cortex drilled	1	..	..	..	1
Joint incised and drained	5	..	1	..	6
Soft tissue abscess incised, adjacent joint aspirated, incised and drained	1†	..	..	..	1
Repeated aspiration of joint	1	..	..	..	1
Repeated aspiration of joint, followed by incision and drainage	4	..	..	1	5
Cortex drilled and window removed, adjacent joint incised and drained	1	..	..	1	2

* Tibia (original finding) subperiosteal abscess distal end. Subcortical abscess proximal end drained 48 hours later.
† Subsequent amputation.

granulation tissue throughout the central portion of the medulla. It is felt that this is probably best explained by retrograde thrombosis plus infection, although the possibility of hematogenous origin of both lesions or direct extension of infection cannot be eliminated.

Metastatic lesions were most frequent in group III, which concurs with the experience of Wilson and

McKeever.[7] Pathologic fracture occurred twice in the distal end of the femur while in a spica cast, probably the result of the cast becoming loose following decrease of swelling, and once in the tibia during attempts to correct an equinus following incision of a soft tissue abscess.

TABLE 6.—*Pathologic Changes, Complications and Sequelae, and Results*

	I No Sequestration (19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (42 Cases)	IV Deaths (8 Cases)	Total (75 Cases)
11. Pathologic changes found at operation					
Soft tissue abscess.....	1*	3	32	2	38
Subperiosteal abscess..	1	3	9†	..	13
Subcortical abscess....	1	..	1†	2	4
Suppurative arthritis..	9	..	1	3	13
No gross pus.....	3	..	..	..	3
Suppurative arthritis ruptured into adjacent soft tissue.....	1*	..	..	..	1
Subcortical abscess and adjacent suppurative arthritis.....	2	..	..	1	3
Soft tissue abscess of bone origin and adjacent suppurative arthritis.....	1‡	..	..	..	1
12. Complications and sequelae					
Direct extension (?) of infection within bone; window removed at opposite end 48 hours following initial drainage (tibia).....	..	..	1	..	1
Metastatic abscess					
Bone.....	..	..	9	..	9
Multiple (including bone).....	..	..	..	2	2
Pathologic fracture...	..	..	3	..	3
Epiphyseal separation and extrusion.....	..	..	..	1	1
Soft tissue abscess or adjacent suppurative arthritis following apparent arrest.....	1	1	7	..	9
13. Results					
Sequestration					
Clinical and roentgenographic.....	..	5	42	..	47
Clinical only.....	..	1	..	..	1
Not demonstrable...	19	..	..	..	19
Healing time.....	22 days-2 years	4 months-21 months	Series incomplete§		
Average.....	3-4 mos.	12.5 mos.			
Amputation (occupational and economic)	1	..	..	..	1
Deaths.....	..	..	..	8	8

* Under 1 year of age.
† Tibia, original finding 59 hours after onset subperiosteal abscess distal end. Subcortical abscess proximal end drained 48 hours later. Staphylococcus aureus recovered from blood and wounds.
‡ Subsequent amputation.
§ Thirty-three cases now arrested. Healing time from 15 to 36 months, average 23.4 months.

The healing time in group I was roughly one-fourth that of group II and one-eighth that of group III.

Amputation was performed in one case in group I because of a painful unstable knee following extension to the joint from the proximal end of the tibia. For occupational and economic reasons this was desired by the patient and would probably have been necessary at a later date regardless of his wishes.

Serous effusions are not considered to be joint infections and are not included. Only those cases in which gross pus was obtained and subsequent x-ray examination revealed destructive lesions of bone adjacent to an epiphyseal line, in part at least intracapsular, are reported as suppurative arthritis of bone origin.

Bisgard[8] reports this complication in 19.3 per cent of a series of 217 cases of acute and chronic osteomyelitis at the University of Chicago Clinics.

Adjacent suppurative arthritis of proved bone origin occurred in 24 per cent of the cases of this group. The average age (14.9 years) was in excess of the series age (10.1 years). The average duration at operation (7.9 days) was appreciably under the series duration (9.6 days). The mortality rate (22.2 per cent) was more than double that of the series (10.6 per cent). The only amputation occurred in this group.

The hip was involved in 55.5 per cent of the cases in which this complication occurred.

Diagnosis of the underlying bone lesion in the majority of cases was made by roentgenograms subsequent to operation. Drainage of the involved joint constituted the only drainage of the underlying bone lesion except when pathologic changes in adjacent bone made additional drainage necessary. Diagnostic aspiration was done as a routine. Lavage was not attempted in any case in this series.

Positive cultures were obtained from the joint in eleven cases (61.1 per cent) of the series and in all cases of groups III and IV in which the complication occurred. Within the positive culture group a staphylococcus was found in five cases (45.4 per cent), a streptococcus in four cases (36.4 per cent), Bacillus pyocyaneus in one case (9.1 per cent), and a pneumococcus in one case (9.1 per cent).

It is realized that differentiation between a turbid effusion and gross pus when both are negative to cul-

TABLE 7.—*Symptoms, Origin and Treatment in Adjacent Suppurative Arthritis*

	I No Sequestration (13 Joints, 19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (1 Joint, 42 Cases)	IV Deaths (4 Joints, 8 Cases)	Total (18 Joints, 75 Cases)
14. Adjacent suppurative arthritis on admission (18 cases); mortality rate, 22.2%					
Sex					
Males.....	8	..	..	3	11
Females.....	5	..	1	1	7
Age.....	10 mos.-64 yrs.	..	11 yrs.	9 mos.-47 yrs.	
Average.....	15.4 yrs.			14.4 yrs.	14.9 yrs.
Duration of symptoms prior to operation	1.25 days-22 days		19 days	4 days-14 days	
Average.....	6.6 days			9.7 days	7.9 days
Bone of origin, and joint involved					
Femur—hip.....	4	..	..	1	5
Acetabulum—hip....	3	..	..	..	3
"Hip".....	..	..	..	2	2
Femur—knee.....	2	..	1	..	3
Tibia—knee.....	2	..	..	1	3
Ulna—elbow.....	1	..	..	..	1
Tibia and fibula—ankle.....	1	..	..	..	1
Treatment					
Joint incised and drained.....	5	..	..	2	7
Joint aspirated; subsequent incision and drainage (8 hrs.-21 days).....	4	..	..	1	5
Joint and adjacent soft tissue abscess incised and drained	1	..	1	1	3
Joint aspirated and adjacent soft tissue abscess incised and drained.....	1	..	..	..	1
Joint aspirated (repeatedly).....	1	..	..	..	1
Adjacent subperiosteal and subcortical abscesses and joint drained.....	1	..	..	..	1

7. Wilson, J. C., and McKeever, F. M.: Hematogenous Acute Osteomyelitis in Children, J. Bone & Joint Surg. **18**: 328-332 (April) 1936.

8. Bisgard, J. D.: The Relation of Pyogenic Arthritis to Osteomyelitis, Surg., Gynec. & Obst. **55**: 74-80 (July) 1932.

ture is largely a matter of opinion, but when purulent material is obtained on joint evacuation and subsequent roentgenograms reveal osteomyelitis adjacent to an epiphysis, which is in part at least intracapsular, the drainage of pus from the primary lesion into the joint cannot be denied regardless of cultural reports.

In group I, consisting of nineteen cases, no clinical or roentgenographic evidence of sequestration occurred. Within this group the adjacent joint was involved in thirteen cases. On cultural comparison it was found that joint cultures remained sterile in 53.8 per cent, while bone cultures were sterile in 16.6 per cent.

TABLE 8.—*Bacteriology and Joint Culture in Adjacent Suppurative Arthritis*

15. Adjacent suppurative arthritis on admission (18 cases); mortality rate, 22.2%	I No Sequestration (13 Joints, 19 Cases)	II Small, Localized Sequestrums Extruded Spontaneously (6 Cases)	III Sequestration Requiring Surgery (1 Joint, 42 Cases)	IV Deaths (4 Joints, 8 Cases)	Total (18 Joints, 75 Cases)
Bacteriology					
Growth blood and joint	2	..	..	1	3
No growth blood; growth joint	2	..	..	2	4
No growth blood or joint	4	..	..	..	4
No growth blood or joint; growth bone	1	..	..	..	1
No growth blood; growth joint and bone	1	..	..	..	1
Growth blood, joint and bone	..	..	1	1	2
No record blood, growth joint	1	..	..	..	1
No record blood; no growth joint	1	..	..	..	1
No record blood; no growth joint or bone	1	..	..	..	1
Joint culture					
No growth	7	..	..	..	7
"Staphylococcus"	2	..	..	1	3
Staphylococcus albus	..	..	1	1	2
Streptococcus haemolyticus	2	..	..	..	2
Streptococcus non-haemolyticus	2	..	..	..	2
B. pyocyaneus	..	..	..	1	1
Pneumococcus	..	..	..	1	1

Cofield [9] noted the frequency of sterile joint cultures in septic arthritis. Cotton [10] believes that joints are relatively tolerant to infection. Pearson [11] feels that the fluid in such joints is at first serous and sterile but will become purulent if neglected. Reich [12] states: "If repeated aspiration and lavage are unsuccessful, the condition is undoubtedly the result of an osteomyelitis." He attributes the frequent negative joint culture to some attenuating action occurring within the joint. Beekman [13] observes that further extension within the bone is unlikely if an early metaphyseal lesion ruptures into a joint and that free drainage of the involved joint is the only operative procedure required.

It is felt that the involvement of joints from adjacent areas of bone infection aids mechanically in decompressing the bone, thereby decreasing bone destruction. It seems probable that such involved joints possess bactericidal properties the nature of which is unknown at present. Experimental work should here prove of value.

9. Cofield, R. B.: The Treatment of Septic Arthritis, Ohio State M. J. **14**: 149-151 (March) 1918.
10. Cotton, F. J.: Infections of Bones and Joints, Surg., Gynec. & Obst. **31**: 254 (Sept.) 1920.
11. Pearson, William: Acute Osteomyelitis, Irish J. M. Sc., May 1927, pp. 215-218.
12. Reich, R. S.: Purulent Arthritis, J. Bone & Joint Surg. **10**: 554-578 (July) 1928.
13. Beekman, Fenwick: Acute Hematogenous Osteomyelitis, Bull. New York Acad. Med. **6**: 792-807 (Dec.) 1930.

In this series the female mortality exceeded the male by more than 50 per cent. A staphylococcus was recovered on blood culture, alone or in combination with Streptococcus haemolyticus, in 75 per cent of the cases within this group. Death occurred within one week of the onset in three fourths of the cases. Two of the cases were of the fulminating type, in which death apparently resulted from the overwhelming initial infection. In retrospection the wisdom of early drainage in these two cases is questioned. In four of the remaining cases, blood cultures were persistently positive and death resulted from general sepsis.

The mortality in the group with one or more positive blood cultures was 28.6 per cent. No intravenous medication other than repeated blood transfusion was given. This was done in the room or ward as part of the general policy of local and general rest. General treatment was otherwise symptomatic. Secondary abscesses were drained in the ward or room when fluctuation developed. The low mortality rate and the high percentage of positive blood cultures in this group resulted in constant checking of culture technic and comparison of culture reports with the clinical picture without discovery of gross error or discrepancy. In view of the fact that in nine cases only the admission culture was positive and subsequent cultures were repeatedly negative, and because of the average short duration of symptoms on admission, it is felt that many of these cultures were obtained during the phase of primary transient bacteremia. Early drainage precluded more than one preoperative blood culture. Of the twenty-one cases in which a positive blood culture was obtained on admission, all were treated by surgical drainage. Six patients died, while in the remaining fifteen cases subsequent negative cultures were obtained. In no case presenting a negative blood culture on admission was a positive blood culture obtained subsequent to operation.

CONCLUSIONS

1. In children under 2 years of age the clinical course of the disease varies widely from that of adults.

2. The American Negro appears to be relatively immune to the disease in this section.

TABLE 9.—*Cultural Comparison of Groups With and Without Adjacent Suppurative Arthritis on Admission*

16. Group I. No Sequestration (19 Cases)	With Joint Involvement (13 Cases)	Without Joint Involvement (6 Cases)
Ages	10 mos.-64 yrs. (av. 15.4 yrs.)	6 wks.-40 yrs. (av. 16.1 yrs.)
Duration of symptoms prior to drainage	29 hrs.-22 days (av. 7.8 days)	22 hrs.-8 days (av. 3.1 days)
Positive cultures	6	5
Days from onset to operation	2.7 days-17 days (av. 8.7 days)	22 hrs.-8 days (av. 3.2 days)
Negative cultures	7	1
Days from onset to operation	29 hrs.-22 days (av. 6.8 days)	2.5 days

3. Acute hematogenous osteomyelitis must be considered when pyrexia and localized pain on bone pressure coexist in the absence of an obvious cause.

4. The majority of the best results were obtained by drainage of the bone within one week following the onset. The mortality rate was also highest in cases in which drainage was instituted within this period.

5. The pathologic changes present, while usually directly proportionate to the duration of the symptoms, are influenced by many other factors.

6. Acute, pyogenic, suppurative arthritis should be considered to be osteomyelitis of an adjacent bone until proved otherwise.

7. Clinically, joints are more resistant to infection than bone and apparently possess marked bactericidal properties.

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ABSTRACT OF DISCUSSION

DR. EDWIN W. RYERSON, Chicago: The impression that I gain from Dr. Robertson's paper is that it will be a very useful study in the tabulation of what every one hopes will be many series of similarly analyzed cases, and in a few years, when a number of investigations from different localities and clinics have been made, orthopedic surgeons will be in a better position to judge in an individual case as to the treatment. Nothing can be done about the prevention. There are some points of interest, and one of them is the tenderness on local pressure, not sudden and sharp but rather soft and continuous. A few months ago I saw a little girl in Chicago who complained of pain around her knee. Movement in the joint was unimpaired, but she had a fever of 102 and on deep pressure over the lateral condyle of the femur she winced. Although there was little evidence in the roentgenogram of any lesion, an operation was advised and revealed a focus of osteomyelitis exactly like Dr. Robertson's first picture. That is one important point. Another point that interested me was his conclusion that extension of an osteomyelitis adjacent to a joint, into the joint, decompressed the original focus and made the patient's pain less. So far as I know, that is an original idea. I shouldn't advise as a method of treatment that, in order to decompress an abscess, one should bore a hole into the joint and into the abscess. But it is interesting because it shows that this young man has thought about his cases and has reasoned about them. Another point of interest was the low incidence of osteomyelitis in the Negro race. That I had not known before.

DR. JOSEPH I. MITCHELL, Memphis, Tenn.: Dr. Robertson has presented proof of the value of early diagnosis and treatment in acute osteomyelitis. Early blood culture studies have been made and in a large proportion of his cases the cultures were positive. The inciting cause of osteomyelitis is bacteremia; in some cases this bacteremia persists or becomes septicemia. I think that is the explanation of the high mortality rate in this disease. When the bacteremia is transient, subsequent blood culture is negative and the patient will, as a rule, recover. When septicemia ensues, the patient stands a very good chance of losing his life. The largest percentage of the fatal cases occurs, as Dr. Robertson said, within the first two weeks. The other point that he brought up, about the incidence in the Negro race, I would like to substantiate. For some reason, I do not know what, osteomyelitis seems to be less frequent in the Negro, at least in Memphis, than among the white people.

DR. ROBERT L. PRESTON, New York: I am interested in the 24 per cent of cases that were complicated by acute suppurative arthritis. For the past two years I have been studying the problem of experimental acute staphylococcic suppurative arthritis, in an attempt to find out what factors are responsible for the bad results that are so frequently seen. I feel that the facts brought out by an analysis of observations have a direct bearing on the problem of acute hematogenous osteomyelitis. In the course of this experimental work a measured amount of Staphylococcus aureus-haemolyticus was injected into the knee joint of rabbits. The typical acute suppurative arthritis picture developed: marked swelling with distention of the joint with pus, disorganization of the joint, erosion of the articular surfaces and spread of the infection into the surrounding bones and soft parts. In those cases in which treatment was delayed, there was a tendency for metastatic abscesses to develop in the lung, heart, liver and kidneys, and for metastatic bone and joint infections to appear. As injection of the knees of other animals continued with available strains of Staphylococcus aureus, there began to be an entirely different picture. With some of these strains the local joint damage was negligible but the animals died because of a marked toxic degeneration of the kidney, heart muscle and gastro-intestinal tract. In this type of infection, metastatic abscesses were never seen. Repeated inoculations of a large series of animals with either the toxic or the abscess strains of Staphylococcus aureus continued to produce definite, characteristic clinical pictures. It became evident that some strains of Staphylococcus aureus were involved which produced a markedly destructive and invasive lesion at the site of inoculation and had a tendency to produce metastatic abscesses, and other strains of Staphylococcus aureus which produced but little local damage at the site of inoculation and killed the animal by overwhelming toxemia. This toxic clinical picture is much like that produced by such exotoxin-producing organisms as Bacillus diphtheriae. This analogy is further substantiated by the fact that a virulent exotoxin could be isolated from these strains and could not be isolated from the abscess-producing type of staphylococcus. Since these two markedly different pictures characteristically result from infection with different strains of Staphylococcus aureus, it is evident that the therapeutic indications in staphylococcic infections must differ widely. These studies seem to indicate that the local and systemic damage following acute staphylococcic suppurative arthritis does not depend on whether or not joints are particularly resistant to infection or whether synovial fluid

TABLE 10.—*Deaths in Group IV*

17. Group IV. Deaths (8 Cases, All White)* Apparent Cause of Death	Sex and Age	Bone and Complication	Duration of Symptoms	Operation	Bacteriology: Blood	Bacteriology: Wound	Outcome Post-operative
A. General blood infection			5 days	Abscesses incised	Staph. albus		7 hrs.
1. Condition critical on admission	♀ 8 yrs.	Femur and radius distal ends; soft tissue abscess					
	♂ 10 yrs.	Femur, distal subcortical abscess	56 hrs.	Cortex drilled and windowed	Staph. aureus haemolyticus		8 hrs.
2. Condition not critical on admission; subsequent metastatic abscess formation	♂ 47 yrs.	Tibia—proximal subcortical abscess; suppurative arthritis of knee	14 days	Cortex drilled and windowed; aspiration and incision	Staph. aureus and Strep. hemol. 2 times	Staph. aureus bone and joint once	9 days
	♀ 10.5 yrs.	Tibia—proximal subcortical abscess	60 hrs.	Cortex drilled and windowed	Staph. 5 times	Aureus, 1 time	23 days
	♂ 8 yrs.	Femur—neck; suppurative arthritis of hip	4 days	Point aspirated and incised	Staph. 5 times	Albus, 1 time	66 days
	♀ 12 yrs.	Tibia—proximal and mandible; soft tissue abscess leg	6 days	Abscess incised; 2 teeth extracted	Staph. 2 times	Albus, 1 time	78 days
B. Meningitis	♀ 9 mos.	Suppurative arthritis of hip	7 days	Aspiration 5 times at 3 day intervals; incision 16th hospital day	No growth	and spinal fluid B. pyocyaneus	18 days
C. Pneumonia	♂ 2 yrs.	Suppurative arthritis of hip	14 days (following lobar pneumonia)	Joint aspirated and incised	No growth	Pneumococcus	15 days

* Mortality rate; series 10.6 per cent; (male 8.7 per cent, female 13.8 per cent).

has bactericidal properties. It seems to depend on whether the joint is infected with the toxic or abscess type of Staphylococcus aureus.

DR. JAMES B. WEAVER, Kansas City, Mo.: It has long been known that the staphylococcus produces an exotoxin which is hemolytic and necrotizes tissue. It has been known for some time that adults have in their blood stream a certain amount of natural antitoxin to the staphylococcus. Children very rarely have any natural antitoxin. Patients suffering from deep staphylococcic infections have a large amount of antitoxin in the blood stream, as a rule. A method of measuring this antitoxin has been in use for several years. It is simple, much more simple than the Wassermann test, and is carried out something after this manner: A rack of test tubes is set up in which there is 1 cc. of washed rabbit cells used as an indicator. A definite amount of antitoxin and various dilutions of the patient's serum are placed in each tube. After sitting in the water bath for a while, it is removed to the refrigerator. When the toxin is in excess of the antitoxin in the patient's serum, hemolysis takes place, and the reading is made in the amount of dilution in the patient's serum. I don't know when a case of osteomyelitis is cured. These cases should be reported as five year cures, ten year cures, and so on. Most of the deaths from acute osteomyelitis occur in the first ten days. It is my belief that these deaths are due to toxemia and not to bacteremia. Pathologic specimens in these cases show destruction of vital organs due to toxemia and not to destruction of vital organs but to bacterial invasion.

THE RÔLE OF ALCOHOL IN CIRRHOSIS OF THE LIVER

A CLINICAL AND PATHOLOGIC STUDY BASED ON FOUR THOUSAND AUTOPSIES

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Cirrhosis of the liver is a fairly common chronic disease, presenting in its later stages a well recognized clinical and pathologic picture. In its early stages, while the histologic aspects may be recognized with reasonable accuracy, the clinical diagnosis is seldom evident and frequently is based more on presumption than on fact.

Great diversity of opinion exists regarding the etiology of the disease, from both a clinical and an experimental point of view. In a general way it is believed to be the result of various toxic and infectious agents, which cause a destruction of the liver cells and produce a proliferation of the connective tissue that ultimately leads to fibrosis of the organ.

For many years alcohol has been considered one of the commonest causes of cirrhosis of the liver, so much so that the term "portal cirrhosis" is used almost synonymously with "alcoholic cirrhosis" and as such heads the list in most classifications of the disease. Other factors considered in the etiology are syphilis, tuberculosis, diabetes, and such acute infections as measles, scarlet fever, typhoid and pneumonia. Such substances as copper, arsenic, lead and silver, bacterial toxins, especially of intestinal origin, condiments such as chillies and spices, and a deficiency of vitamins A, C and D, and fats and proteins in the diet, all, at one time or another, have been suspected of causing the disease.

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Experimentally, it is generally accepted that alcohol alone will not produce cirrhosis of the liver. However, when administered in combination with other toxic substances, cirrhosis has been produced.

In recent years there has been growing an increasing tendency to dispute the status of alcohol in the development of cirrhosis. It was with this in mind, especially, that the present investigation was undertaken. We wished to determine the incidence of cirrhosis of the liver, based on histologic evidence, as it occurred in a large general hospital—the ratio of age, sex and race, and, more especially, the relation borne to the disease by alcohol and the acute infections, and by syphilis, diabetes and tuberculosis. For this purpose 4,000 autopsies were studied. They were all performed during the period from March 1933 to July 1935. The period happened to cover approximately the first two years following the repeal of prohibition. Whether the fourteen year era of prohibition preceding this period, during which there presumably was less drinking of strong spirits, might be of influence in the facts presented, is debatable.

We recognize with others the inadequacy of the terms portal, biliary, fatty, and the like in classifying cirrhosis, and the desirability of a classification based on etiology. Considering the uncertain state of knowledge, however, concerning the etiology, the difficulties inherent in such a classification are obvious. While we do not presume to offer a new classification for the cirrhoses and will present our cases in accordance with the more familiar terminology, we believe that a more accurate and descriptive classification of the disease, based at least on our observations, would be as follows:

1. *Circulatory.*—The result of prolonged failure of the circulatory system incident to advanced myocardial degeneration and leading to the so-called red atrophy of the liver or cardiac cirrhosis.

2. *Degenerative.*—The usual portal or atrophic type, which results from a degeneration or necrosis of liver cells, and proliferation of fibrous tissue and bile ducts, often accompanied by an extreme degree of fatty infiltration of the remainder of the liver parenchyma. This type is generally attributed to the effect of alcohol or other toxic agents.

3. *Infectious.*—The result of a continuous low grade infection, probably brought to the liver from some portion of the gastro-intestinal tract or possibly from the spleen. It exhibits in the periportal spaces increased fibrous tissue, which is sparsely or densely infiltrated with lymphocytes and plasmocytes in particular. Bile duct proliferation is not so marked.

4. *Obstructive.*—Characterized by bile stasis, increased fibrous tissue and bile duct proliferation, the latter often extreme, and the result of obstruction to bile flow (gallstone, compression from cancer cells, primary and metastatic, and so on).

5. *Pigment.*—The deposition of abnormal pigment, as carbon, hemosiderin or hemofuscin, which produces by mechanical irritation essentially the same histologic picture that is seen in the obstructive types.

To satisfy the purpose of our study, cases were grouped as follows: 1. All those regardless of the history that presented definite or questionable histologic evidence of cirrhosis, the latter being subgrouped. 2. All cases in which the clinical history stated that the patient was addicted to alcohol. 3. Cases in which the liver weighed more than 2,000 Gm., excepting those in which the liver was enlarged as a result of leukemia, amyloid disease, carcinoma or other conditions not concerned with this study.

In the first group, which showed histologic evidence of cirrhosis of various types, there were 243 cases, an incidence in the 4,000 autopsies of slightly more than

6 per cent. Mallory [1] noted in a study of more than 8,000 autopsies covering a period of thirty-three years an incidence of 5.89 per cent. In the first table it will be noted that the majority were white males. It is significant that in this general group only eighty-four, or 35 per cent, gave a definite history of alcoholism, while in 159, or 65 per cent, there was no such history. It should be stated here that, of the 243 cases of cirrhosis, only two were observed in children.

It will be noted in table 2 that 150, or 62 per cent, of the cases, comprising the majority, as would be expected, were of the so-called portal type. We do not refer to this as alcoholic cirrhosis, which would be in agreement with most clinical classifications, as 105, or 70 per cent, of these cases did not present any history of alcoholism.

We would suggest the term degenerative, instead of portal or alcoholic, as more descriptive of this type of cirrhosis. It is characterized by degeneration or necrosis of the liver cells with proliferation of fibrous tissue and bile ducts, accompanied by an extreme degree of fatty infiltration of the remainder of the liver parenchyma.

Under the fatty group we placed thirty-four cases. An extreme degree of fatty metamorphosis, which is a common finding in so-called alcoholic cirrhosis, was noted in these cases. Although it was unaccompanied by a definite bile duct proliferation or fibrosis, the picture suggested a beginning cirrhosis. Of this group, twenty-six, or 80 per cent, had an alcoholic history.

The third most frequent type was cardiac cirrhosis, of which there were thirty-three cases, or 14 per cent of the total, a sharp drop in the incidence, compared to portal cirrhosis. Twenty-eight, or 85 per cent of these thirty-three cases were nonalcoholic. We believe that a more appropriate term for this type of cirrhosis would be "circulatory." The typical histologic picture is that of so-called red atrophy, the result of prolonged failure of the circulatory system incident to advanced myocardial degeneration.

TABLE 1.—*History of Alcoholism*

Consecutive autopsies analyzed			4,000
Total number cases of cirrhosis			243, or 6%
Alcoholic			84 (35%)
Male		66	
White	57		
Black	9		
Female		18	
White	16		
Black	2		
Nonalcoholic			159 (65%)
Male		87	
White	63		
Black	24		
Female		72	
White	51		
Black	21		

The next commonest variety was an infectious type of cirrhosis, of which there were eighteen instances, or 7 per cent. These cases exhibited in the periportal spaces increased fibrous tissue sparsely or densely infiltrated with lymphocytes and plasmocytes in particular. Bile duct proliferation was not so marked in this group. The picture strongly suggested an infectious etiology.

Biliary cirrhosis was observed in only eight cases, or 3 per cent of the total, and these were equally divided among the alcoholic and the nonalcoholic.

It is of interest to note that no case of pigment cirrhosis was observed in the 4,000 autopsies. While hemosiderin was seen not infrequently in the sections, it was not in sufficient amounts to be of significance and we do not believe that such cases justly can be regarded as pigment cirrhosis. The true type of pigment cirrhosis, hemochromatosis, likewise was not observed, indicating its comparative rarity.

It is apparent in table 3, from a study of the age distribution in the cases studied, that cirrhosis in its fully developed form is a disease of advanced years, the largest number of cases having been observed in the sixth and seventh decades. A striking number for the age were seen in individuals between 20 and 50 years of age. It is significant that the majority of these individuals were young white men addicted to alcohol, which is the reverse of what was encountered in the older decades. It may be that the incidence of cirrhosis in the alcoholic declines in the older age groups because such individuals do not live long enough to develop cirrhosis.

TABLE 2.—*Ratio of Alcoholism to Types of Cirrhosis (243 Cases)*

Type	Alcoholic	Nonalcoholic	Total	Per Cent
Portal: Degenerative	45	105	150	62
Fatty metamorphosis	26	8	34	14
Cardiac (circulatory)	5	28	33	14
Infectious	4	14	18	7
Biliary (obstructive)	4	4	8	3
	84	159	243	

In order to establish further the relation of alcohol to cirrhosis, we selected from the 4,000 autopsies reviewed all cases in which alcoholism was mentioned in the history, as shown in table 4; of these there were 228 instances. Of these fifty-eight, or 24 per cent, showed definite cirrhosis. If we included in this group the twenty-six fatty cases showing an intense fatty infiltration or metamorphosis which is usually suspected to result from alcohol, there still would be an incidence of only 37 per cent in the alcoholic group. On the other hand, there were 144, or 63 per cent of the alcoholic group, without any evidence whatever of cirrhosis.

Still further to determine the rôle played by alcohol, we selected the third group, or those in which the liver weighed over 2,000 Gm., with the exceptions previously mentioned, as large, fatty livers, obviously not the result of some terminal infection, are frequently referred to as alcoholic. Of these there were 151 cases, seventy-five of which were alcoholic and seventy-six nonalcoholic. Of the alcoholic, twenty-seven, or 40 per cent, had portal cirrhosis. Eight additional cases were fatty. Of the nonalcoholic, twenty-seven, or 39 per cent, had portal cirrhosis, with six additional cases fatty.

Ascites is regarded as a fairly frequent complication of cirrhosis, especially of the portal type. It was observed in our series in 35 per cent of portal, in 36 per cent of cardiac and in 50 per cent of the biliary group of cirrhoses. In the portal and cardiac types it was seen largely in the nonalcoholic, while in the biliary group it was evenly divided.

Jaundice was noted in 30 per cent of the portal, 18 per cent of the cardiac and 62 per cent of the biliary group. In the cases of portal cirrhosis, jaundice was noted in an equal number of the alcoholic and the nonalcoholic. In the cardiac and biliary cases it was observed more frequently in the nonalcoholic.

Ascites and jaundice were associated in 17 per cent of the portal, in 6 per cent of the cardiac and in 37 per

1. Mallory, F. B.: Cyclopaedia of Medicine, Philadelphia, F. A. Davis Company **8**: 166, 1935.

cent of the biliary cases. Except in the biliary group, their association was slightly higher in the nonalcoholic.

Since the acute infectious diseases, such as measles, pneumonia and typhoid, are occasionally mentioned as a cause of cirrhosis, it is of interest that only seventy-six of the 243 cases of cirrhosis, or slightly more than 31 per cent, gave a history of such infections. The greater number of these were in the nonalcoholic group. It did not appear from an analysis of these cases that the acute infections played an important part in the etiology of cirrhosis.

Active pulmonary tuberculosis was found in twenty-three, or 9 per cent, of the 243 cases of cirrhosis. In eighteen of these the cirrhosis was of the portal type, ten of which were in the alcoholic and eight in the nonalcoholic. Considering therefore that 220 out of 243 cases of cirrhosis showed no evidence of active tuberculosis, it would appear that this disease is not an etiologic factor.

Syphilis was present in twenty-eight, or 11 per cent, of the 243 cases of cirrhosis. It was associated with the portal type of cirrhosis in fourteen, ten of which were in the nonalcoholic and four in the alcoholic. In the remaining fourteen the cirrhosis was of varying types. Since 215 out of 243 cases of cirrhosis were observed in individuals with no evidence of syphilis, we cannot believe that this disease is of importance in the etiology.

Diabetes was associated with cirrhosis in thirteen of the 243 cases. In eight the cirrhosis was of the portal type, one being alcoholic and seven nonalcoholic. The association of these two diseases was so unusual that it did not seem to carry any significance.

The presence or absence of such gross lesions in the digestive tract as ulcer, carcinoma and gallbladder disease was noted in all the cases of cirrhosis. These

TABLE 3.—*Age Distribution in Cirrhosis (243 Cases)*

	Alcoholic	Nonalcoholic	Total
0- 9	0	2	2
10-19	0	2	2
20-29	6	4	10
30-39	16	11	27
40-49	20	18	38
50-59	16	40	56
60-69	18	47	65
70-79	8	29	37
80-89	0	6	6
Totals	84	159	243

TABLE 4.—*Condition Found in Cases of Alcoholism*

Total cases of alcoholism	228	
Definite cirrhosis	58	24%
Fatty metamorphosis	26	13%
No cirrhosis	144	63%

lesions occurred so infrequently that it was quite obvious that they bore no relation to the condition.

From the foregoing analysis it would appear very doubtful that diabetes, syphilis, tuberculosis, the acute infectious diseases or common gross lesions in the digestive tract are of importance in the etiology of cirrhosis. Whatever their influence might be, it is greater in the nonalcoholic group. It is interesting to note in this connection that the ratio of these conditions in the nonalcoholic to the alcoholic is almost 2:1, which is approximately the same ratio of alcoholism observed in the total number of cirrhoses.

It is generally conceded that the cirrhosis attributed to alcohol is of the portal type, but it must be remembered that the same lesion occurs in children and other nonalcoholic persons as well as in certain animals. Furthermore, the incidence of cirrhosis is not in proportion to the amount of alcohol consumed in certain countries; and in some classes, such as the Hindus, who consume little if any alcohol, cirrhosis is relatively frequent.[2] A majority of drunkards do not have portal cirrhosis, as proved at autopsy, according to our obser-

TABLE 5.—*Cases (151) in Which Livers Weighed 2,000 Gm. or Over*

	Alcoholic	Nonalcoholic
Cirrhosis	30	31
Portal	27	27
Biliary	2	3
Cardiac	1	1
Fatty metamorphosis	8	6
No cirrhosis	37	39
Totals	75	76

vations and those of others.[3] Finally, then, as regards the rôle of alcohol, which was the primary purpose of this analysis, it is quite evident from our observations that, contrary to prevailing opinion, alcohol cannot seriously be regarded as a specific cause of cirrhosis of the liver.

SUMMARY

From an analysis of 4,000 consecutive autopsies performed at the Philadelphia General Hospital during the period from March 1933 to July 1935 it is concluded that diabetes, syphilis, pulmonary tuberculosis and the acute infectious diseases, as well as such gross lesions in the digestive tract as ulcer, carcinoma and gallbladder disease, do not bear any relation to the incidence of cirrhosis. It is further concluded that alcohol cannot be regarded as a specific factor in the etiology of cirrhosis. As the lesion defined as portal cirrhosis occurs under influences unassociated with alcohol, we would suggest abandonment of the term "alcoholic cirrhosis."

Rittenhouse Plaza.

ABSTRACT OF DISCUSSION

DR. LEONARD G. ROWNTREE, Philadelphia: I have been interested in this study of Drs. Boles and Clark, particularly in their suggestion as to reclassification of liver disease. In all forms of chronic disease, many attempts are passed through before final classification is attained. Classification eventually leads to clarity. Relative to the rôle of alcohol in the pathogenesis of cirrhosis of the liver, I will discuss three groups of statistics. The first gives the incidence of both diseases from 1910 to 1932 inclusive, as revealed in the mortality statistics for the registration area of the United States. It is apparent that, with the advent of prohibition, the incidence of cirrhosis of the liver in this country dropped 50 per cent. The patients studied in the authors' series came at a period immediately before and after the repeal of the Eighteenth Amendment. It represents, therefore, a transition period. The second group contrasts the incidence of liver cirrhosis and alcoholism in urban and rural districts. New York State is essentially urban and Kansas rural, and in addition Kansas had state prohibition prior to 1917. In New York State the incidence of cirrhosis following prohibition dropped to about one third of its former level, whereas in Kansas the incidence of both alcoholism and cirrhosis is relatively unaffected. In the Cook

2. Rolleston, Humphry, and McNee, J. W.: Diseases of the Liver, Gall Bladder and Bile Ducts, ed. 3, London, Macmillan Company, 1929, p. 216. Tirumurti, T. S., and Radhakrishna Rao, M. V.: Indian M. Gaz. **69**: 74-76 (Feb.) 1934. Radhakrishna Rao, M. V.: Indian J. M. Res. **21**: 389-416 (Oct.) 1933.

3. Formad, H. F.: Tr. As. Am. Physicians **1**: 225, 1886.

County Hospital, following prohibition, the incidence dropped from 600 a year to from 100 to 200 annually. In Montreal, in what might be considered a favorite "wet area" during prohibition, the incidence of cirrhosis increased. In the Mayo Clinic the incidence of cirrhosis is relatively unaffected by prohibition. The question discussed by the authors is one of paramount importance. A study from the Philadelphia Hospital comparable in character, but covering a period from 1920 to 1923, might reveal contrasts of considerable interest. In all studies involving alcoholism and cirrhosis of the liver, there should be sounded one word of caution; i. e., the patient's word is not always trustworthy, and hence other forms of evidence, if available, are desirable. Judging from the statistics available, alcohol in this country is responsible for approximately 50 per cent of the cases of cirrhosis of the liver.

DR. HENRY L. BOCKUS, Philadelphia: In 1685 Browne stated that hardening of the liver in association with ascites was probably due to the drinking of too much water. Paine stated in 1889 that this was a "fault which the bold spirits of the time were much on their guard against." In 1793 Bailie mentioned alcoholism as a factor in the production of cirrhosis, and since that time it has come down to us. Chronic fibrosis of the liver must depend on many factors, on where one lives and how. In the Fijian Islands cirrhosis is attributed to a mytilotoxin from mussels and in Egypt to bilharziasis. The excessive ingestion of spices, such as ginger and cardamom, may account for cirrhosis among the nonalcoholic Hindus. Among coal miners it has been attributed to anthracosis and among stone masons to silicosis. Arsenic, manganese, copper, aluminum, chloroform, naphthol and phosphorus have all been mentioned as possible causes. Many feel that the amount of the toxin and rapidity with which it acts determine the character of liver damage—whether a massive hepatocellular change or a chronic fibrosing inflammation. The authors have mentioned that gastroduodenitis may be a primary factor aided and abetted by alcohol. Mallory has described cases of cirrhosis attributed to a streptococcus and to a colon bacillus. Syphilis and primary splenomegalic disorders, such as Banti's disease, Gaucher's disease and chronic malaria, must account for some cases. Mention should be made also of conditions predisposing to liver injury, as lowering of the glycogen reserve due to dietary deficiency or increased metabolism as well as to anoxemia. The authors have mentioned a new classification for cirrhosis: circulatory, degenerative, infectious and obstructive. Possibly this might be further reduced to three types by combining the degenerative and infectious in one group under the term toxic-infectious. The classification would then be an etiologic one: (1) circulatory, (2) toxic-infectious, (3) obstructive. The latter concept of cirrhosis favors clear thinking in that it discourages the consideration of cirrhoses as a distinct clinical and pathologic entity dependent on any one cause. Physicians should be on the alert for the many etiologic factors that may be responsible for hepatic fibrosis.

DR. RUSSELL S. BOLES, Philadelphia: I certainly do not want to give any impression of condoning the use of alcohol. I should like to know whether Dr. Rowntree's statistics were vital statistics, based on clinical diagnoses. I would draw attention to the fact that our conclusions were reached solely on the basis of histologic evidence. We are not trying to draw conclusions as to etiology or trying to explain our observations in any way. We simply present what we have found. If Dr. Rowntree's curves are plotted on a basis of vital statistics, in turn based on clinical diagnoses throughout the country at large, I think they are open to a question as to their accuracy. It is surprising how frequently the clinical diagnosis of portal cirrhosis is wrong. It is an easy clinical diagnosis to make, but is often a difficult pathologic diagnosis to prove when it has been made clinically. The clientele of some clinics is, of course, quite different from that which we get at old Blockley. When they say there that they drink, they mean a quart or 2 or 3 quarts a day. Furthermore, drunkards are notoriously inaccurate when they say they drink but little. If alcohol is a factor in producing cirrhosis, a greater incidence during the years of prohibition ought to be found, because, if cirrhosis is produced by alcohol, it probably takes a number of years to bring it about, and therefore the drinking that was done prior to prohibition would obviously show its effects during prohibition and result in a higher incidence. Dr. Bockus's remarks are interesting and well taken. We separate the infectious type from the degenerative, because histologically they each present a characteristic picture. I trust that our conclusions will not carry assurance to any one that he is less likely to get cirrhosis if he does drink than if he doesn't drink. From our analysis of the age incidence, it would appear rather conclusive that if drinking has anything to do with cirrhosis it is the drinking done in the more tender years that carries the greater hazard than that done in later years.

LUPUS ERYTHEMATOSUS

A MODIFICATION OF THERAPY WITH GOLD COMPOUNDS

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The alchemists dreamed of a "pure essence of gold" hidden under its divers veils of dross and, by a leap of logic hard for present-day minds to follow, reasoned that, if large doses of this dross free element were consumed, all man's ills would be purged away. Curiously enough eight centuries later the medical profession finds itself hovering closely on the edge of the same dream. Moellgaard [1] dreamed of patients rid of pulmonary tuberculosis by a few injections of gold into the circulating blood. Many others saw and dreamed of a spectacular cure of lupus. And now it is in some quarters used enthusiastically for arthritis and asthma.[2]

While it is well established that certain gold salts may be given intravenously in lupus erythematosus, sometimes with spectacular success, the profession must remain acutely conscious that such treatment has many limitations and is often attended with much danger. The repeatedly reported clinical "cures" and symptomatic relief are clearly supported by the experience of many of us, but there is in the air evidence of an enthusiasm too early divorced from caution. One has but to pass an eye down the column headed "gold" in the *Quarterly Cumulative Index Medicus* to note the frequent occurrence of serious accidents following its use as well as the multitude of disorders for which its use is recommended.

The use of gold salts in pulmonary tuberculosis came about originally as the result of Koch's discovery that gold produced a bactericidal action on the tubercle bacillus in vitro. Moellgaard [1] believed that it prevented experimental tuberculosis in rabbits and calves and would cure pulmonary tuberculosis in man. But when it was used in man it was often followed by disastrous results. These disastrous results were attributed to the death and liberation of large numbers of tubercle bacilli but are now known to be the result of the death of tissue from the gold salts. Large doses were given in an effort to produce a theoretical sterilization which in fact did not exist. In spite of disasters, however, many still hold that the gold salts possess much useful-

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1. Moellgaard, H.: The Sanocrysin Treatment of Tuberculosis, Brit. M. J. **1**: 643 (April 4) 1925.
2. Gold Therapy in Arthritis, editorial, J. A. M. A. **105**: 2163 (Dec. 28) 1935.

ness in certain forms of pulmonary tuberculosis, but its specificity for the tubercle bacillus is no longer held.[3]

It was a short jump from the use of gold in pulmonary tuberculosis to its use in tuberculosis of the skin and thence to lupus erythematosus, on the mistaken notion of its tuberculous etiology, and so its dermatologic usefulness has roughly paralleled its history with pulmonary tuberculosis. It is now more or less generally believed that the gold compounds cause stimulation of all cells entering into the formation of chronic inflammation and into the process of healing;[3] hence there is some reason for its apparent value in chronic arthritis and asthma.

All reports agree on the toxicity of the gold compounds.[4] Experimental work shows that gold even in high dilutions, like arsenic, is a capillary poison, seemingly having a selective action on the contractile elements of the vessel wall. Following the intravenous injection in the experimental animal there is a sudden dilatation of capillaries, the capillary bed being increased fourfold; hemorrhage and slowing of the blood stream occur, and the animal is "bled" to death in its own capillaries.[5] When gold is given more slowly, in smaller or more dilute doses, capillary reaction also occurs, but much of the element is retained and distributed in the connective tissue bed surrounding the capillaries, notably in connection with the histiocytes, and there it can be demonstrated by spectrometric tests.[6] Some of the elementary gold apparently escapes with the histiocytes through the mucous membranes of the lung, the gastrointestinal tract and the kidneys. It therefore may be readily seen how a sudden suffusion of the body with large doses of gold may lead to severe and even fatal results. One may also read in such observations a theoretical explanation for the action of gold in a chronic inflammation such as lupus erythematosus.

All reports likewise agree on the value of gold in the alleviation of lupus erythematosus, the earlier reports showing relatively much more enthusiasm.[4] The more recent observations seem to be in favor of extreme care in reporting complete cures. We have all observed clinically the rapid dissolution of inflammation and edema in a small patch of relatively early lupus erythematosus after a few injections of gold as often as we have observed the slow reaction to such treatment in the old and scarred lesion. Experimentally, gold produces varying degrees of inflammatory reaction, depending on its concentration and location, and factors such as capillary dilatation, inflammation or injury to tissue seem to favor its deposition in larger quantities.[6] It would seem that there is at hand a drug which may produce a varying degree of counterirritation in somewhat the same manner as the application of heat, except that it is more continuous in its action—but with heat one can readily and immediately remove the counterirritant, whereas with gold the remedy is often irrevocable.

Driver and Weller [7] and recently Wright [8] have quite clearly demonstrated a high percentage of accidents following the use of gold compounds, the latter reporting a 25 per cent reaction in all cases that he had treated intravenously. The reactions observed by others have been as a whole in excess of this. Cole [9] went so far as to doubt whether the values of gold compounds outweighed their dangers. While undoubtedly the fatalities and reactions reported may be in part due to overdosage, injudicious use or individual sensitivity, the gold salts are nevertheless often administered by those uninformed of their dangers. It would seem wise, therefore, to consider favorably a useful method of giving gold which is as near fool proof as possible, yet containing much of its efficacious qualities. Both the manufacturers of gold compounds and the clinicians using these preparations have attempted to devise formulas that will prevent accidents—witness the long list of gold compounds in use today. Monash and Traub[10] have suggested that the gold compounds should be given intracutaneously directly into the diseased tissue —a method somewhat uncomfortable but provocative of good results. Traub [11] later reports that the same result may be obtained with other metallic substances.

The majority of the gold compounds in use have been marketed in the form of a crystalline powder with instructions to give immediately after they have been dissolved in distilled water, thus preventing reactions due to oxidation of the solution. In recent years an American manufacturer has marketed gold and sodium thiosulfate, $Na_3Au(S_2O_3)_2.2H_2O$, in a stable buffered aqueous solution instead of as a crystalline powder. Such a solution ready for immediate use eliminates many possible chances of error, such as contamination, use of poorly distilled water, and the occurrence of oxidation products. In a small clinic or in the office where time and assistance may be at a premium, such a preparation is of considerable value.

Since the fall of 1931 we have treated fifteen patients having lupus erythematosus with this prepared stable solution of gold and sodium thiosulfate, given hypodermically instead of intravenously as usually given.[12] Twelve of these cases we have been able to follow and determine the results of treatment. Four of the twelve we can record as arrested at the present writing. We use the term "arrested" rather than "cure," since our experience with the use of gold salts in lupus erythematosus has been that the determination of "cures" is difficult if not doubtful. All these patients have improved while undergoing treatment. With the exception of one, all the patients had one or more recurrences in areas apparently healed or in new areas. In only

3. Henrichsen, K. J., and Sweany, H. C.: Sanocrysin Treatment in Tuberculosis, Am. Rev. Tuberc. **28**: 1 (Oct. supp.) 1933. MacCormac, H.: Two Cases of Lupus Erythematosus Treated by Stovarsal, Proc. Roy. Soc. Med. **28**: 107 (Dec.) 1934.

4. These include:
Schamberg, J. F., and Wright, C. S.: The Use of Gold and Sodium Thiosulfate in the Treatment of Lupus Erythematosus, Arch. Dermat. & Syph. **15**: 119 (Feb.) 1927.
Whitehouse, H. H., and Bechet, P. E.: Lupus Erythematosus, Lupus Vulgaris, Tuberculids and Tuberculosis of the Skin: Treatment with Gold Compounds, ibid. **16**: 563 (Nov.) 1927.
Roxburgh, A. C., and Corsi, H.: The Therapeutic Value of Gold Compounds, Brit. J. Dermat. **42**: 382 (Aug.-Sept.) 1930.
Strandberg, J.: Six Years' Experience in the Treatment of Lupus Erythematosus with Gold Compounds, Acta med. Scandinav. **75**: 296, 1931.
Rutledge, W. U.: Lupus Erythematosus, Arch. Dermat. & Syph. **23**: 874 (May) 1931.
Towle, H. P.: The Present Status of Gold Therapy, New England J. Med. **204**: 487 (March 5) 1931.
Throne, Binford; Kingsbury, Jerome, and Myers, C. N.: Unusual Clinical Manifestations Following Intravenous Administrations of Gold Compounds, Arch. Dermat. & Syph. **25**: 494 (March) 1932.
Throne, Binford; Clark, A. S.; Van Dyck, L. S., and Myers, C. N.: Treatment of Lupus Erythematosus with Gold Compounds, New York State J. Med. **27**: 1064 (Oct. 1) 1927.
Myers, C. N.; Hooper, C. W., and Throne, Binford: Gold Preparations in Therapy, Proc. Soc. Exper. Biol. & Med. **24**: 749 (May) 1927.
Discussion on the Therapeutic Value of Gold Compounds, Proc. Roy. Soc. Med. (Sect. Dermat. & Med.) **23**: 1383 (July) 1930.

5. Krogh, August: The Anatomy and Physiology of Capillaries, New Haven, Conn., Yale University Press, 1929, p. 198.

6. Gaul, L. E., and Staud, A. H.: Quantitative Distribution of Gold in the Body, Arch. Dermat. & Syph. **32**: 768 (Nov.) 1935.

7. Driver, J. R., and Weller, J. N.: Untoward Results from the Use of Gold Compounds, Arch. Dermat. & Syph. **23**: 87 (Jan.) 1931.

8. Wright, C. S.: Ten Years' Experience in the Treatment of Lupus Erythematosus with Gold Compounds, Arch. Dermat. & Syph. **33**: 413 (March) 1936.

9. Cole, H. N., in discussion on Wright.[8]

10. Monash, Samuel, and Traub, E. F.: Modification of Therapy with Gold Compounds in Lupus Erythematosus, Arch. Dermat. & Syph. **24**: 110 (July) 1931.

11. Traub, E. F., in discussion on Wright.[8]

12. Jones, J. W., and Alden H. S.: Modification of Therapy with Gold Compounds in Lupus Erythematosus, Arch. Dermat. & Syph. **28**: 544 (Oct.) 1933.

one instance can we record any evidence of reaction to the drug given subcutaneously and that, focal in character, was in a patient known to be sensitive to gold preparations. Previous to the use of this method we had treated three cases of lupus erythematosus by the intravenous route with triphal (sodium salt of aurothiobenzimidazole-carboxylic acid) and one with gold and sodium thiosulfate. In two of these cases general reactions developed, one severely with dissemination of the disease, so we had a healthy respect for the dangers of gold salts intravenously and welcomed this innovation.

The drug at first was marketed in ampules containing 25 mg. of gold and sodium thiosulfate dissolved in 2.5 cc. of water. The contents of the ampule were given subcutaneously in the upper arm at intervals of one week. Any larger quantity of solution seemed to produce considerable pain. Owing to an increase in the number of patients applying for treatment and the limited supply of the drug, we later had to reduce the weekly dosage to 12.5 mg. and found that the results in most instances were just about as good. The improvement in the eruption was not as rapid as in some instances in which gold was given intravenously,

Summary of Twelve Cases Treated with Gold and Sodium Thiosulfate

Case	Age	Sex	Color	Duration of Eruption	Type of Eruption	Type of Treatment	Total Mg. Gold	Comment
1	56	F	Negro	4 yrs. progressive	Bat wing, chronic discoid	Gold and sodium thiosulfate subcutaneously once weekly	675	Improved slowly under both types of treatment; after one year had slight recurrence; stopped treatment
2	25	F	Negro	1 yr.	Cheeks discoid	Gold and sodium thiosulfate subcutaneously once weekly	975	After 16 injections 25. mg. each, clear; recurrence 1 mo.; 19 injections 25 mg., clear followed by second recurrence; stopped treatment
3	11	F	Negro	1½ yrs.	Cheeks, nose, tips of fingers discoid	Gold and sodium thiosulfate	925	Fingers clear after 13 injections 25 mg.; face improved after 15 injections; recurrence after 1 yr. rest; 9 more injections, little improvement; stopped treatment
4	24	F	Negro	6 mos.	Tip of nose, upper lip discoid	Gold and sodium thiosulfate subcutaneously	555	After 8 injections 25 mg. each, clear; recurrence, upper lip in 5 mos.; 11 injections, improvement; after 8 injections triweekly, 10 mg. each, marked improvement
5	12	F	White	1 yr.	Tip of nose discoid	Gold and sodium thiosulfate weekly and triweekly	685	Well after 9 injections 25 mg. each; recurrence 8 mos.; 10 mg. every other day
6	45	F	White	4 mos.	Cheeks and tip of nose discoid	Gold and sodium thiosulfate triweekly	170	Continued improvement; regular treatment; 17 injections; well
7	40	M	White	3½ yrs.	Cheeks discoid	Gold and sodium thiosulfate biweekly	170	Treatment regular biweekly; marked improvement; pulmonary tuberculosis healed
8	42	F	White	5 yrs.	Recurrent in summer; disseminated erythematous areas, legs, feet, body	Gold and sodium thiosulfate triweekly	200	Treatment continued, improvement; acute return followed x-ray treatment of ulcer; quickly subsided; Well tuberculous ulcer surgically removed
9	27	F	White	6 mos.	Discoid type, temple	Triphal intravenously; gold and sodium thiosulfate subcutaneously weekly, triweekly and daily	2,600	Improved much on triphal intravenously, 1929; remained so 2 yrs.; after 20 injections gold and sodium thiosulfate 25 mg. each intravenously, and 31 subcutaneously, improved; 3 years later, recurrence upper lip; 16 subcutaneous injections weekly, no improvement; under treatment weekly injections 10 mg. each subcutaneously, improved
10	65	M	White	6 mos.	Superficial erythematous type, ears and cheeks	Gold and sodium thiosulfate subcutaneously weekly	1,600	Improved gradually over period of 1½ yrs.; fairly regular treatment; at present is clear of trouble
11	45	M	White	20 yrs.	Diffuse discoid type	Gold and sodium thiosulfate intravenously and subcutaneously	?	Unimproved under intravenous treatment and had reaction; no improvement subcutaneous injections gold, and had mild focal reaction
12	14	F	Negro	6 yrs.	Small discoid, base of nose	Gold and sodium thiosulfate subcutaneously once weekly	372	Thirteen regular weekly injections, well; recurrence 2 mos. later; 3 injections, well; remained so for 1½ yrs.

METHOD OF TREATMENT

The method of giving gold and sodium thiosulfate subcutaneously came about purely by accident and by the fortuitous collusion of circumstances. In a small dermatologic clinic, lack of time and assistance made it difficult to dissolve the gold salts and give them intravenously. After we had obtained a small quantity of the aqueous solution of gold and sodium thiosulfate from the manufacturers we administered several doses by the intracutaneous method advocated by Monash and Traub.[10] On observation that there was considerable improvement in the areas of lupus erythematosus that were not treated, a single subcutaneous injection was given in the upper arm, with surprisingly little pain and discomfort and after several doses with much improvement. It was obvious that if this method could be used treatment would be much simplified and could be given with ease by a nurse or untrained assistant. but it had its compensations in safety and simplicity. After two years of experience in six cases of lupus erythematosus we had observed no local or general reactions with this method and no induration, pain or discoloration at the site of injection, and we began to give doses of 10 mg. (1 cc. of solution) subcutaneously every other day and in some instances daily. This method brought about a more rapid improvement in the disease in most instances, so much so that two patients asked specifically for more frequent doses. This manner of treatment was facilitated by the marketing of the gold solution in rubber-stoppered ampules containing 5 cc. of solution (50 mg), from which small quantities might be taken without fear of contamination of the remaining stock. Our best results have been obtained in those patients who were able to get 10 mg. of gold and sodium thiosulfate subcutaneously regularly three times a week.

Of the twelve cases that we were able to follow and observe, five occurred in Negroes, curiously all women. The disease in all instances was of the chronic, slowly progressive, discoid type, leaving much destruction in its wake (enhanced by the tendency toward depigmentation). As a whole the results of treatment in the Negro were neither as rapid nor as satisfactory as in the white patients, owing much to their disinterest and irregularity and frequent discontinuance of treatment, so we can record but one arrested case among them.

We were able to follow up more or less accurately all twelve of our cases, as shown in the accompanying table. Four of these cases, 33⅓ per cent, can be considered at the present writing as arrested. Six patients, or 50 per cent, have had a marked improvement in their eruption, and in two the eruption has remained stationary after an initial improvement. All but two of the patients had at some time a recurrence of the disease either at the original site or in a new area. Two of the cases occurred in children, both of whom tolerated the drug well and improved quite rapidly, but recurrences were frequent. One of our cases was of the superficial disseminate type, in which acute dissemination had occurred following exposure to sunlight. The patient had no untoward reaction to gold treatment but did have a twenty-four hour flare up following roentgen irradiation to a tuberculous ulcer. The eruption has been arrested for some months. In no instance could we consider this method of treatment as provocative of any general reaction, and in only one instance was there any focal reaction and that in an individual known to be sensitive to gold preparations.

REPORT OF CASES

CASE 6.—A white American housewife, aged 45, asked for relief of an atrophic erythematous eruption the size of a quarter dollar (24 mm.) on each side of the bridge of the nose, extending to the lower lids, and a single small patch on the tip of the nose. All areas had been spreading since their appearance four months before. A diagnosis of lupus erythematosus was made and she was given 10 mg. (1 cc. of solution) of gold and sodium thiosulfate subcutaneously every other day for thirteen successive doses. After the third injection there was slight itching of the affected areas. After the fifth injection, marked improvement was noted. After the thirteenth injection the original lesions were hardly apparent. She was then given four additional injections at weekly intervals. Her skin has remained clear for six months. Total treatment lasted two months and she received a total of 170 mg. of gold and sodium thiosulfate.

This case exhibited a rather marked and rapid improvement. Much of this improvement must be ascribed to early diagnosis and to regularity and frequency of treatment.

CASE 3.—A Negro school girl, aged 11 years, came for relief of a slowly spreading, scarring eruption on the cheeks, nose and tips of the fingers, which had been present for eighteen months. A diagnosis of lupus erythematosus was made and she was given 25 mg. of gold and sodium thiosulfate (2.5 cc. of solution) subcutaneously in the upper arm at irregular weekly intervals. After thirteen injections the eruption on the fingers had cleared and the areas on the face had partially improved. Fifteen more injections at more irregular intervals resulted in slight improvement in the face. She returned one year after the last injection with a definite increase in the area of eruption on the face but no recurrence on the fingers, and she received nine more injections with little or no improvement, and she stopped treatment.

The patient refused to take treatments three times a week, and even all attempts to get her to take regular weekly treatments failed. This fact and the length of time she had the eruption account to some extent for her lack of improvement.

CASE 9.—A white American housewife, aged 27, asked for relief of an atrophic erythematous skin eruption the size of a ten-cent piece (18 mm.) on the right temple. She was given a number of intravenous injections of triphal, 50 mg. each at weekly intervals (number unknown), with complete healing of the lesion. One year later a recurrence of the superficial erythematous type occurred on both temples and under the left eye and cheek. Eight injections of gold and sodium thiosulfate intravenously in 25 and 100 mg. doses resulted in relief. Two years later she returned with a discoid infiltrative type of eruption on the temples and cheeks which had been present for eighteen months and slowly spreading. She was given four intravenous doses of gold and sodium thiosulfate, 100 mg. each, and she stopped treatment for two years, at which time the lesion had spread and become scarred and infiltrated. She was then started on gold and sodium thiosulfate subcutaneously in 25 mg. doses at weekly intervals. After thirteen doses there was very little spread and at the patient's request the injections were given intravenously. After fourteen weekly injections still no improvement was noted. Gold and sodium thiosulfate was then begun subcutaneously three times a week. She is still under treatment with very slight improvement.

This case illustrates the often observed good effect of gold preparations in the early erythematous type of lupus erythematosus. The almost complete lack of improvement under gold therapy in the recurring lesion is difficult to explain.

COMMENT

Doubtless all will agree that in the treatment of disease the safety of the patient is of paramount importance. Particularly is this true in the dermatologic manifestations of disease, such as lupus erythematosus which rarely produce death. In contemplating the treatment of such a disease, with a drug which is known to produce reactions, sometimes of a severe degree and occasionally death, one must weigh carefully the risks to be taken. If under the best care at least 25 per cent of cases treated result in reactions and one third are arrested or "cured" and one half are improved, the margin of profit in treatment does not seem to be great. But such is the situation after ten years of experience with the treatment of lupus erythematosus with gold compounds.[13] However, when one considers how unproductive of results other therapeutic endeavors have been in the past, such results are, to say the least, gratifying. Since the more general use of gold compounds in lupus erythematosus the quantitative dose recommended has steadily lessened, and more and more one reads statements of relief of symptoms on dosages so small as to be hardly considered by earlier workers.[14] As the heat of enthusiasm calms it must be realized that one cannot expect quite the curative results that were reported in the beginning, unless one is willing to sacrifice lives and health, and it must also be realized that the gold compounds are not specific for lupus erythematosus. As much as we would like to share Semon's[15] prophecy and hope of 1927 that the gold compounds will in the future be as specific and efficacious in lupus erythematosus as arsenic is in syphilis, we find it impossible to do so.

In all the cases herein reported we have throughout given amounts of gold that are relatively small in the

13. Wright.[8] Cole.[9] Monash and Traub.[10] Traub.[11] Jones and Alden.[12] Haxthausen, H.: Treatment of Lupus Erythematosus by Intravenous Injections of Gold Chloride, Arch. Dermat. & Syph. **22**: 77 (July) 1930.

14. Haxthausen.[13]

15. Semon, H. C. G.: Treatment of Lupus Erythematosus by Krysolgan, Brit. M. J. **2**: 258 (Aug. 13) 1927.

light of previous reports, with results not as spectacular but comparable. We have used a prepared stable aqueous solution of gold and sodium thiosulfate which is simple in application and is given subcutaneously rather than intravenously and hence is less likely to result in accidents either from the method or from biologic phenomena. Taken as a whole the injection of gold and sodium thiosulfate subcutaneously in our cases has been free from fear of untoward reactions and simple in application and not uncomfortable to the patient, as well as efficacious in the relief of symptoms of lupus erythematosus. We believe that, all things considered, this method of giving gold salts to patients with lupus erythematosus is probably safer, more fool proof, simpler and probably as efficacious as the intravenous route.

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ABSTRACT OF DISCUSSION

DR. JAMES K. HOWLES, New Orleans: While my experience has not been that of the authors, in some thirty-odd cases which have been treated at Charity Hospital we have noticed no untoward results, no general reactions. I have, however, as high a regard for the symptoms of pruritus in the treatment of intravenous gold preparations as I have for intravenous arsenicals. Perhaps much of the adverse criticism is due to the fact that proper preparation is not achieved or selection of cases is not practiced. The champions of other therapeutic agents in lupus erythematosus report results just as favorable and promising as those of the gold therapists. Bismuth, both the subsalicylate and other forms, bismuth oxychloride, the arsenicals in the pentavalent form, acetarsone and even tuberculin have had their proponents, so that the possibility of the nonspecific effect of this drug must not be disregarded. It is granted by all that it is not a specific drug and that the action is thought to be on the inflammatory process and the healing process, in fact on all the cells that take part in those processes. If such is the case, perhaps a combination of drugs might obtain the desired result. I wonder whether a combination of gold preparations with bismuth wouldn't obtain results more favorable than the individual drugs. Intramuscular or subcutaneous medication is safer than intravenous. The subcutaneous method is far more desirable, especially for general practitioners. Perhaps sensitization enters into the question; it may be possible in time to do skin tests to eliminate individuals sensitive to gold. I have often noticed in patients treated with intravenous gold preparations a complaint of pruritus immediately afterward and sometimes a slightly delayed reaction. In thirty cases I have never noted any severe reaction.

DR. M. E. OBERMAYER, Chicago: Drs. Alden and Jones have emphasized in their work the safety of this new method. It was with the same view in mind that we undertook at the University of Chicago in 1931 the clinical study of a new gold compound which was synthesized by Kharasch and Isbell of our Department of Chemistry. This compound is ammonium succinimide aurate, $NH_4Au(C_4H_4O_2N)_4.4H_2O$. Its toxicity is so low that 1 Gm. of the substance caused no toxic phenomena in a rabbit of 3 Kg. We have been using this compound for the last five years with satisfactory results. The therapeutic effect of ammonium succinimide aurate was found to be somewhat equal to that of gold and sodium thiosulfate, but it is in the paucity and mildness of the reactions that the new compound shows its superiority. Gold dermatitis, for instance, was completely absent. In spite of single doses as high as 1,000 mg., the toxic reactions that have been observed so far were practically negligible. We feel that, like Dr. Alden and Dr. Jones, we have contributed to the safety of gold therapy, and a report on these studies will be made in the near future.

DR. MARTIN ENGMAN JR., St. Louis: I would like to relate an incident that occurred in my father's ward when gold first came out. He had treated a few cases and had good results. One day there came to the ward at Barnes a patient with an acute disseminated lupus erythematosus. Gold was ordered intravenously, the dosage being stated to the intern. The next morning the patient was at least 50 per cent better, and my father remarked to the students and interns what a wonderful acquisition gold was in the treatment of the disease. Meantime the intern was pulling at his sleeve, trying to get a word in: "But Doctor, by some mistake the patient didn't get the gold that you prescribed." I don't know whether we are right or not, but we look at the leukocyte count as a rough guide and the type of lupus erythematosus as a guide in the administration of gold. If the leukocyte count is lower than 5,000, we decide that gold therapy should be delayed until the leukocyte count is brought up. We are not quite sure just why we do this; but we base it mainly on the fact that there is definitely a lowered leukocyte count in disseminated cases. We don't like to give gold in disseminated cases that are very acute or are becoming acute.

DR. JOHN HOWARD KING, Nashville, Tenn.: About ten years ago the use of gold salts in this country created enthusiasm. Indiscriminate and indiscreet practice followed. During the past three years there has been much criticism of these drugs, tending to deprive physicians of their most valuable weapon in combating this disease. Recently I reviewed some work of Dr. Hamilton and myself. It covers a period of ten years. During that time we treated ninety-six cases of lupus erythematosus with sodium gold thiosulfate. We had no deaths. There were six obvious reactions. Only one was severe enough to put the patient to bed. This was an elderly woman with a distinct nephritis. The other five reactions were in ambulatory and casual patients. One patient had mild exfoliative dermatitis. The earliest sign was stomatitis, especially seen on the inner surface of the lower lip. That was our danger sign. Two unusual reactions were observed. The patients had malaise and soreness in the sides of the neck, a sort of cervical adenitis lasting three or four days. In the severe cases recovery occurred in three weeks. Between 1,100 and 1,200 doses were given intravenously. They varied from 10 to 100 mg. The majority were 100 mg. All but twelve patients were private patients closely observed. Various reports show from 20 to 30 per cent reactions. Several deaths are reported. Our percentage of reactions is about six, with no deaths. About 80 per cent of the cases were well arrested. About 30 per cent relapsed and were rearrested. A small percentage were arrested the third time. I congratulate the authors on the presentation. It may prove to be a valuable contribution in preventing the discontinuance of this most valuable drug.

DR. WILEY M. SAMS, Miami, Fla.: I should like to comment on Dr. Engman's remarks regarding the importance of leukopenia. I have had one serious reaction in a small number of cases treated. This reaction occurred after the woman had had a good number of injections without any reaction whatever. She had had no gold given for about three weeks, but during that time she had had dengue fever, a disease which is characterized by leukopenia. The next injection produced a fulminating exacerbation.

DR. HERBERT RATTNER, Chicago: I should like to report briefly our experience at the University of Illinois. After Dr. Jones's preliminary report of this method of treatment we undertook it in some fifteen or twenty cases. We gave smaller doses; we didn't give them as often as the present report states but we soon discontinued the treatment because we felt definitely that results were not as good as with the intravenous method, and in almost every case we found it necessary to discontinue the subcutaneous method and go back to the intravenous. It is true that there was no pain and none of the reactions that are sometimes encountered when gold compounds are administered intravenously.

DR. HERBERT S. ALDEN, Atlanta, Ga.: I had no intention of presenting too severe a picture of gold reaction; it was merely the picture that I get from the literature. It seemed to us that although the method was not as spectacular and not quite as immediately efficacious as the intravenous method, it would be the best method that could be used in a general way, particularly among the general practitioners. It is a method that one could prescribe for the general practitioner in the smaller towns surrounding one's community and ask him to give over a longer period of time without fear that the patient would get into difficulties. It was more with that in view that we reported these results, in an effort to give the country patient the opportunity to get gold by a safer method. In regard to Dr. King's remarks as to why he didn't get gold reactions, I have no

answer. I don't think any one knows just why people have reactions to gold. We are glad to hear of Dr. Obermayer's gold preparation, ammonium succinimide aurate. It should prove to be of great value. I think one will find that if one uses the subcutaneous method of administering gold in the office or the clinic one will feel that it is not as spectacular, but for some of us who have small dermatologic clinics and treat referred patients coming from the outlying districts, I am sure it will be of distinct value.

TERMINATION OF ONE THOUSAND ATTACKS OF MIGRAINE WITH ERGOTAMINE TARTRATE

MARY E. O'SULLIVAN, M.D.
NEW YORK

For the past few years in the neurologic service at Bellevue Hospital, under the direction of Dr. Foster Kennedy, we have been studying the etiology and treatment of migraine. Realizing that this affliction is not a disease entity and that there is more than one precipitating factor in the production of this syndrome, we felt it essential to investigate this paradox from many different angles.

In a report in 1934 we [1] approached the problem from a pharmacologic point of view. At that time we administered known vasodilator and vasoconstrictor agents, also glandular products such as pitressin, extract of anterior pituitary, theelin and insulin. We also studied the effects of carbon dioxide inhalation, of vagomimetic and of sympathomimetic compounds on the attacks. These various medications were used in order to compare the relative effectiveness of numerous nonsedative measures in relieving the episode, as well as to determine the factors capable of precipitating a headache.

The diversity of our results during these investigations reinforced our belief that the pathophysiology in the production of migraine is not a single one. We did not prove its mechanism. Our results in appraising the nonsedative medicines used to relieve the attacks were more explicit.

Eleven medications were administered during the migraine headache in order to effect relief. They were caffeine, histamine, epinephrine, ephedrine, mecholin, amniotin, tissue extract, pitressin, amyl nitrate, calcium gluconate intravenously, and ergotamine tartrate. Of these, ergotamine tartrate was the only drug that gave definite and constant results. Its effect was outstanding. The other medications might help on the first injection but fail at another time to benefit the very same person. These other measures might relieve two patients and then fail in seven others. The relief obtained from ergotamine tartrate was dramatic. It completely checked thirty-four headaches in fourteen patients. It failed to alleviate only five headaches in four patients. We noticed that, once it relieved an episode, control of future attacks in that individual was assured if the drug was given in adequate dosage.

In discussing the value of a medication in the treatment of as complex a syndrome as migraine, a group of eighteen patients is not a sufficient number from which to draw any worth-while conclusions. Because of this, and because of the consistent and spectacular relief obtained from the drug, we felt that further study of its action in relieving the attack should be undertaken.

Our criteria for diagnosis and inclusion in our migraine research series have been discussed in a previous report.[1] These patients have received metabolic studies and blood chemistry and Wassermann tests. X-ray plates of the skull, the sella turcica and the nasal accessory sinuses were taken, and also a gastro-intestinal and a gallbladder series if indicated by the anamnesis. The patients were thoroughly examined for any pathologic process that might be active in the various bodily systems, since they were examined by a psychiatrist, an allergist, a rhinologist and an ophthalmologist.

CHECKING OF ATTACKS BY SUBCUTANEOUS INJECTION

We have now used ergotamine tartrate over a two year period and can discuss our results after having administered the drug for the relief of 1,132 headaches. There were ninety-seven patients—seventy-eight females and nineteen males—in this later study. Their ages varied from 11 to 51 years. They had suffered from migraine for from six months to forty-eight years; the average duration of the illness was sixteen years; the frequency of the attacks varied from two a week to one or two a year.

All but eight of the ninety-seven patients were benefited by this medicament. It completely checked 1,042 episodes in eighty-nine persons. Of the eight patients whose headaches were not controlled by ergotamine tartrate there were four who believed that the pain was alleviated by the injection. The relief obtained was not complete, however, and "of no more benefit than a headache powder." They were not included in our larger group because its criterion is abrupt termination of the attacks.

We found that there was no difference in the action of the medicament when given to men and to women. It was administered to nineteen men and all but three of them were benefited by the alkaloid. The proportion, three out of nineteen, is practically the same ratio that occurs with the common use of the drug.

Early in our investigations we realized that ergotamine tartrate could not be used as a cure for migraine. It is most impracticable to dispense it as a preventive of the attacks, even though it is of unquestionable value in aborting them. This ability to check the episodes unfailingly is, however, a worthy tool to use while one is searching for a cause and cure of the malady. It gives the investigator something very definite to offer the patients, without interfering with the effects of his other investigations. It bolsters the patient's spirits, many of them stating "Well, if you can't do any more for me than you have done, it will still be very wonderful."

Ergotamine tartrate has no effect on the frequency of the attacks. Several patients stated, in their usual disheartened manner, that the episodes were coming more frequently since they had been receiving the injections. On examining our charts and studying the intervals of the headaches before and after the use of the drug, we noticed a shorter interval occurring in only three of our patients. Two of these, were women at the menopause, and one was a man aged 48. They had suffered from migraine "all their lives," and the interval had become shorter and shorter through the years; therefore, this diminishing frequency should not necessarily be considered an effect of ergotamine tartrate. At other

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The author is indebted to Fredrika Wilcoxon for technical assistance.
1. Brock, Samuel; O'Sullivan, Mary E., and Young, David: Am. J. M. Sc. **188**: 253 (Aug.) 1934.

times, when from our data we felt that the drug was increasing the attacks, with further study this lessened interval was found to be only temporary. Such an irregularity in the occurrence of the episodes is a very characteristic finding in migraine, whether the patients take any medication or not.

A number of these men and women have expressed the fear that the beneficial effects of this medicine would wear off. They said that all the other medications that they had ever taken would relieve the attacks for a few months but after a short time would become ineffective. Their skepticism has so far proved to be unfounded. While using ergotamine tartrate over a two year period we have never seen it fail to check an attack merely because of continued usage. One individual whose attacks have been coming weekly has received 129 injections, another patient sixty-four and a third fifty-eight; they have always had unfailing relief from this medicament.

The same infallibility holds true for all our eighty-nine patients. Once ergotamine tartrate has abolished an attack, it has never failed, in our two years' experience, to check again a migraine headache in that individual if given in adequate dosage.

DOSAGE

The amount of alkaloid required to effect relief, however, is very important in proving or disproving this infallibility theory and is worthy of a little consideration. The minimum effective dose, of course, is directly proportional to the severity of the attack. The severity of the consecutive attacks in migraine, as every one knows, is exceedingly variable. Some attacks will be particularly intense, continuing for two or three days, while others occurring in the same individual will be rather moderate and will last only a few hours. Unless one keeps this in mind, the headaches may be abruptly terminated four out of five times, but the fifth attack may be one of these very severe ones; the dose may be inadequate, the effect disappointing and the patient discouraged. By anticipating this (the patients can usually tell when they are "in for a bad one"), a slightly larger dose may be given and an unsatisfactory experience avoided.

Eight episodes, which would have continued for from three to five days if they had not been checked by the alkaloid in from one to three hours, returned from twelve to twenty-four hours after the injection in eight of our cases. This recurrence of the headaches is the exception and not the rule, however, for the same eight persons have obtained complete and permanent relief from sixty-two other attacks. We believe that this reappearance is again probably the result of inadequate dosage. A second injection will control this returned episode.

While discussing dosage and tolerance, we felt that it would be of value to study our records and to compare the amount of alkaloid required to terminate an attack at the onset of therapy (ergotamine tartrate) with the minimum effective dose after the drug had been administered for over a year. To our amazement, we found that not only were none of the patients requiring more of the medication but many of them were requiring smaller doses now than at the onset. I do not wish to leave the impression, however, that we believe that this lessened dosage is due to any effect from ergotamine tartrate; that would not be correct. It is probably caused by several other factors.

In the first place, we have observed that the earlier in the attack the drug is given, the smaller is the dosage required. Once the episode has reached its peak, the patient prostrated, vomiting and unable to raise his head from the pillow, a much larger dose is necessary to check the attack, and it takes much longer for any amount to give relief. The after-effects of both the headache and the ergotamine are much more disagreeable.

If patients will take the medication the moment they feel the prodromes and are sure that they "are in for a real one," the attack may be completely aborted by a smaller dose in much less time and the untoward effects of the drug will be greatly lessened.

From our experience, after using many experimental procedures in attempting to find a cure for migraine, we have concluded that ergotamine tartrate may be used in conjunction with these other measures without coloring their results. Therefore, we have given this drug during the administration of an expected cure in order to control those attacks which may break through. This explains why many of our patients now require a smaller dose of ergotamine tartrate to check the attacks than they did at the onset of therapy, because these preventive measures have been lessening the severity of the episodes and likewise decreasing the minimum effective dose.

Any disease that will incapacitate an adult, interfering with his work for a day or more from one to four times a month is a definite economic liability. Eighty-four persons in this series suffered from migraine attacks at least once a month or more. The time necessary for ergotamine tartrate to effect complete cessation of the episode, even though it would ordinarily persist for from two to three days when given hypodermically, was from fifteen minutes to five hours. This varied in individual cases with the dosage, with the time of administration and with the severity of the attack. We have calculated from our records that the subjects in our series were freed from approximately 39,000 hours of suffering.

Three individuals whose attacks always occurred in the middle of the night or the early morning, awakening them from their sleep, would get out of bed, take their medicine, return to bed, awaken the next morning and go to work as if nothing had happened. Without this drug they would have been incapacitated from their work for at least an entire day.

One woman who is at the menopausal age and whose attacks have been coming weekly during the entire year and continuing for two or three days has stated over and over again that she does not know how she would exist if it were not for this medication. She is a school teacher and by necessity self supporting. Without the medicine she believes that she could not carry on.

Concerning the administration and dosage of ergotamine tartrate, there are several points worthy of discussion. In this country the drug [2] is prepared in tablets containing 1 mg. of the alkaloid, and it is also marketed in solution in sterile ampules for intramuscular and intravenous use (0.25 mg. = 0.5 cc. and 0.5 mg. = 1 cc.). Some investigators have applied the drug to the nasal mucous membranes; [3] others have incorporated it into suppositories for rectal absorption.

Our method of administering the drug subcutaneously is to inject a trial dose of 0.25 mg., and the effectiveness of this we use as an index to future medication. If the drug is well tolerated and if it

2. Trade name Gynergen, manufactured by Sandoz Chemical Works, Inc., to whom we are indebted for a liberal supply of this alkaloid for our investigations.

3. von Storch, T. J. C.: Personal communication to the author.

terminates the attack within two hours, we consider that dosage a satisfactory one for future episodes. It is advisable to repeat the initial dosage of 0.25 mg. if after two or three hours the headache persists, or if after from eight to twelve hours the attack returns. If repetition has been necessary, we consider our original order inadequate and for future attacks 0.5 mg. is given.

We have never injected a larger dose than 0.75 mg. of ergotamine tartrate subcutaneously to relieve one attack, and this amount has been used only three times in our investigations. It is quite rare that a patient needs more than 0.5 mg., and this is a usual and safe amount.

ORAL USE

In dispensing the alkaloid orally we have observed that if the required amount is taken at once, rather than in divided doses, a more efficient relief will be obtained. One tablet contains 1 mg. of the alkaloid. We have given as many as five of these at one time to check an attack. If as large a dose as this is used, we would strongly advise against administering any more ergotamine tartrate within twelve to twenty-four hours.

If, before the medication is given, nausea and vomiting have set in, it is useless to dispense the tablets. They will probably only increase this condition and will interfere with the use of the medicine hypodermically.

It has been suggested that the ergotamine tartrate by mouth, one tablet three times a day, will prevent the migraine attacks from appearing.[4] We do not recommend this method of dispensing the drug. Migraine is a protracted condition and we do not know what serious effects the daily use of the drug over long periods of time may have on our patients.

Although this form of medication may prolong the interval in between the periods and although it may abort some of the milder headaches and even diminish the intensity of a few of the more severe ones, it will not completely inhibit or cure the pathologic condition.

In the third place, the migraine attacks occur very irregularly and undependably in most patients. To give as costly a medicament as ergotamine tartrate daily, when if no medication were taken the patient might go for several weeks without an attack, is wasteful. In a patient who has been suffering from weekly or biweekly headaches the attacks may spontaneously come at monthly or biyearly intervals, and the medication would have been given in vain.

Early in our investigations we tested the value of this method of therapy and found it unsuccessful. One of these patients, after the foregoing method of dispensation failed, took the pills, two or three at a time, the minute she felt an attack appearing. This dosage seemed to stall off an episode for that day, but it usually reappeared on the following one, necessitating further therapy. She continued in this manner for several months and was taking, therefore, two or three pills daily, or approximately 10 to 21 mg. of the alkaloid a week. We have advised against this medication and are administering the drug hypodermically. If the attacks occur twice a week she receives only 0.5 to 1 mg. a week, because her headaches are completely terminated by 0.25 to 0.375 mg. when the alkaloid is given subcutaneously.

The results of the alkaloid, no matter how administered, will be much more satisfactory if the drug is used early in the attack. As soon as the patient realizes that an episode is inescapable, the prescribed dosage should be taken. If the injection or the pills are given during the peak, with the patient vomiting and prostrated, the headache will be more difficult to control. The beginning of an attack and the tail end are readily checked by a smaller dose.

It is most important that the patients lie down after the medication. A headache that can be checked within one to two hours may be considerably lengthened unless the patient relaxes after its administration. Our routine clinic order is to rest for from one to two hours or until the headache has completely disappeared.

The results obtained from the use of ergotamine tartrate orally and hypodermically in controlling the migraine attacks are so dissimilar that it is necessary to discuss them separately. A statement which is an accurate description of the effects following hypodermic injection cannot be applied to the response obtained from the tablets. All the previous assertions concern the reactions that occur after the subcutaneous use of the alkaloid.

We have dispensed the tablets to forty-five patients, and only thirty-one of them obtained complete relief; this does not equal the 92 per cent of patients who were benefited by the injection. The time required by the tablets before termination of the attack can be expected varies from one to eight hours, averaging about five hours. The average time required for the injection to check the attack is from one to three hours.

The theory of the individual infallibility of ergotamine tartrate, once it has relieved an attack, is fallacious when applied to the effect of the tablets in relieving the headaches. Their beneficial action is dependent on too many factors, such as the state of the gastro-intestinal tract at the time of dosage, the severity of the attack, and the time of administration of the drug. No matter how many times tablets have aborted a headache, if there is severe nausea, if the attack is too intense, or if their administration has been delayed too long, the oral use of ergotamine tartrate may fail to give relief.

Because the tablets are less dependable does not mean that they should not be dispensed for relief of the episodes. Their advantage over the hypodermic use of the drug is obvious and any medication that benefits 69 per cent of the migraine patients is of definite value in the treatment of this enigma. I have stressed these differences in action between the two forms of the alkaloid because I feel that one should not condemn the drug because of the failure to check the headache following its oral administration.

CONCOMITANT SYMPTOMS AND THEIR ALLEVIATION

Although ergotamine tartrate, subcutaneously, caused abrupt termination of 1,042 headaches in eighty-nine patients and, when given orally, it completely checked sixty-three headaches in thirty-one patients, it did produce uncomfortable concomitant symptoms in many individuals.

These untoward effects were nausea, vomiting, weakness of the legs, stiffness of the joints, a sense of constriction in the throat, a heaviness of the chest, and a burning and tingling of the fingers and toes.

These symptoms did not all occur in the same patient at one time. Forty-two patients vomited after ergotamine tartrate. In eighty-three of our patients nausea and vomiting were associated with the headaches, even before any medication was given. There was no direct relationship between the occurrence of the gastric symptoms before and after the medicament. Five patients

4. Podalsky, A.: West Virginia M. J. **29**: 173 (April) 1933. Trautmann, E.: München. med. Wchnschr. **75**: 513 (March 23) 1928.

vomited after the drug, and in these individuals there has not been any gastric complaints with the attack. Ten persons who did not suffer from nausea and vomiting with the headaches felt no gastric distress after the drug.

Twenty persons who suffered from these gastric disturbances before the medication were indifferent to their occurrence after ergotamine tartrate because they associated vomiting with relief of the attacks and rather expected it.

In ten patients, if the medicament was given early enough in the episode the entire attack could be aborted, the headache effaced and the individual entirely well before the gastric symptoms had a chance to develop. In these persons, if the attack should continue to its peak, these gastric disturbances would become very intense.

When the nausea and vomiting following ergotamine tartrate therapy are severe enough to disturb the patients, atropine 1/100 grain (0.0006 Gm.) injected with the alkaloid, or any time after its use, will alleviate this distress. It was necessary for us to use this combination on only twelve occasions, because we were able by our concurrent therapy—the administration of calcium [5] chondroitin sulfuric acid [5] or an estrogenic preparation (progynon) [5]—to diminish the vomiting occurring both with the migraine attacks and after the administration of the drug. These gastric disturbances were by far the most frequent of the untoward results of the drug. Nineteen of our patients, however, described muscle pains following the injection. In three of them they were very severe and continued for a day after the headache had been abolished. The milder forms of this muscle pain were described by a few other persons as a restlessness and an inability to find a comfortable spot for their arms and legs.

Calcium gluconate 10 cc. intravenously will relieve these muscle pains almost immediately, and daily calcium therapy will diminish or prevent their recurrence. Atropine hypodermically or orally, in the foregoing dosage, has inhibited and relieved them on several occasions.

Thirty-seven of our patients complained of generalized weakness associated with the migraine attack. Fifteen individuals stated that, after the alkaloid had eliminated the headache, their legs felt tired and weak. It is rather difficult to determine whether this asthenia was caused by the drug or whether it was a coexistent migraine phenomenon that the drug was unable to eliminate. A few of the patients state with certainty that this "all in" feeling is more noticeable to them after the drug than before.

One patient who left the clinic without obeying our routine instructions of lying down for an hour after the medication fell down a flight of clinic steps. She described the accident by saying "My legs just gave way, my knees buckled under me."

Ergotamine tartrate caused a stiffness of the joints in four individuals; in two it affected the jaw, in one the shoulder and in another the ankles.

Two persons felt a slight heaviness in the chest "as if a weight had been placed there," a feeling that made them want to take a deep breath. Six others said that there was a constriction in the throat, "a funny sensation." This did not seem to be particularly disturbing to any of them and occurred rarely.

Two patients complained of numbness and burning of the fingers, which was increased when the hands were placed in very hot or very cold water. We observed on two occasions a painful swelling and redness of the fingers and toes after we had administered ergotamine tartrate and atropine to one of our ward patients. This woman has since received several injections of ergotamine tartrate alone when this did not occur.

5. To be reported.

SIGNIFICANCE OF SYMPTOMS

To those who are familiar with the signs and symptoms of ergotism and its complications, some of these symptoms are portentous. I do not know what the effect of the continued use of this drug may be. I have searched for pathologic changes in electrocardiographic studies on those patients who have taken medication for eighteen months or more and have made frequent blood pressure, blood sugar and kidney studies but have never found any organic changes.

Migraine is a chronic ailment, however, and may last from twenty to forty years. What the action of this medicament on the vascular system will be if used for that length of time, no one can say.

It is important, therefore, to consider this affliction as a syndrome and not as a disease entity, and to realize that more than one factor can precipitate an attack in the migrainous individual. Unless one studies patients and treats any pathologic process, including psychic factors, that may be present, one may be injuring the future health of these persons by administering this alkaloid in large doses over long periods of time. If, however, each individual is carefully studied and if any abnormality—ophthalmologic, gastro-intestinal, functional, infectious, glandular or allergic—that may be present is treated, the severity and frequency of the episodes can at least be lessened. In this manner we have in many instances [5] reduced the yearly intake of the alkaloid to an almost negligible quantity.

Spontaneous cessation of the attacks in migraine is a characteristic observation. In almost any therapeutic and statistical study of the syndrome one can report complete cessation of the attacks in a few patients. In this series two women, both at the menopausal age, have now been without episodes for more than eighteen months. Neither of them had received more than two injections and both of them had suffered from migraine all their lives at monthly intervals.

That psychic factors can precipitate attacks in migrainous persons, most of us who have had any experience with the syndrome will not deny. That they are the only factors in the production of the episode is not in accordance with the observations of this clinic. That psychic factors alone can completely check 1,000 full-blown migraine attacks within from fifteen minutes to two hours, I challenge.

Considering this possibility at the beginning of the investigations, we administered almost all our medications subcutaneously. Because of this, we were able to inject sterile water, pitressin, epinephrine, mecholin, and the like without the patient's knowledge of the contents of the syringe. During an attack, after we had attempted to give relief by several of these measures and they had failed, we would administer ergotamine tartrate. Occasionally some other medicament would alleviate the attack, but there was no comparison between the character, the frequency or the constancy of the relief obtained from these preparations and from the alkaloid of ergot. The results of other workers substantiate further the belief that the pharmacologic action of ergotamine tartrate in checking the episode is not merely a suggestive one.

The use of this alkaloid in the treatment of migraine is not a particularly recent therapeutic measure. Lennox and von Storch [6] in their latest discussion of this therapy have totaled the number of cases reported in the literature. They state that the dozen authors who have given the drug to 300 patients agree that the administration of ergotamine tartrate is effective in stopping migraine headache in the great majority of patients.

How the alkaloid checks the attacks no one really knows. From our experience in this clinic we do not believe that the therapeutic action is merely analgesic. One patient, who received ergotamine tartrate during a headache, had been suffering simultaneously from a toothache. Ergotamine tartrate checked the migraine attack but gave no relief to the molar pain.

Another man, who entered the hospital because of a severe continuous pain in the ulnar nerve, the result of a gunshot injury, developed, while in the ward, one of his biyearly migraine attacks. He had suffered from migraine all his life. The alkaloid was injected and the headache was abolished. The intense pain in his hand, however, was unaffected.

The theory that the pharmacologic reaction of ergotamine tartrate which relieves the migraine attack occurs at the sensory endings is not consistent with the foregoing. Nor does it explain the large number of headaches that occasionally occur in normal people following its injection. We have given the alkaloid to patients suffering from various types of headache that have not in the least resembled migraine. These headaches are usually unaffected by the alkaloid.

Because of the high percentage (90) of satisfactory results obtained by using ergotamine tartrate in the treatment of the migraine attack, in comparsion with the very low percentage of satisfactory results obtained by using it in the treatment of those headaches occurring in the general medical wards, we believe that the reactivity of the drug is more intimately related to the pathophysiologic mechanism of the migraine attack than is suggested by ascribing its action to an analgesic effect. We do not consider the reaction to be a direct one but believe that the action of the alkaloid seems to be dependent on the humoral state of the organism.

The suggestion that the effectiveness of the alkaloid varies with the chemicals and hormones circulating in the blood is based on the differences that occur following administration of the drug to obstetric patients, as well as on the differences occurring when the drug is administered along with other medicaments; for example, calcium, epinephrine, atropine and some of the glandular products.

It is very rare for the obstetrician to see the many untoward results that we have noticed following the use of the alkaloid in normal and migrainous patients. The obstetrician casually prescribes doses which from his experience he knows to be perfectly safe and effective, but doses which we would be extremely cautious in using. This increased tolerance to the drug at parturition, this failure to relieve the general medical headache, the abrupt termination of the classic migrainous attack, have led us to the assumption that the activity of the drug does not merely effect a paralysis of sensory nerve endings but is more intimately connected with the complex mechanism of the still unexplainable migraine seizure.

6. Lennox, W. G., and von Storch, T. J. C.: Experience with Ergotamine Tartrate in 120 Patients with Migraine, J. A. M. A. **105**: 169 (July 20) 1935.

SUMMARY

1. Ergotamine tartrate was administered to ninety-seven patients and checked or aborted 1,042 attacks in eighty-nine of these persons.

2. It was calculated that the individuals in our series were relieved from 39,000 hours of suffering.

3. The earlier in the attack the medication is given, the better are the results.

4. When used subcutaneously, the alkaloid has never failed to check again an attack in a person previously relieved if the drug was given in adequate dosage.

5. Untoward effects of the drug may be relieved by simultaneous injection of 1/100 grain of atropine or calcium gluconate intravenously.

6. I do not consider the drug a cure for migraine. I strongly advise against its dispensation without a consideration of the cause and prevention of the syndrome.

CONCLUSION

Because of the constancy and character of the relief obtained from 1,042 headaches in eighty-nine sufferers of migraine after the administration of ergotamine tartrate, I recommend its use for the termination of these attacks and believe that the drug is a valuable addition to medical therapeutics.

8 West Sixteenth Street.

Clinical Notes, Suggestions and New Instruments

DUPLICATING FILMS OF ROENTGENOGRAMS

MAX COHN, M.D., CHICAGO

The making of roentgenograms in a hospital occasionally leads to a controversy between the patient, the physician and the roentgenologist over ownership of the original films.

Positive prints from roentgenograms are unsatisfactory, and except in certain simple cases the fine details of the original are inadequately reproduced.

Until recently it was necessary for the maker of a roentgenogram either to protect himself by keeping the film in his possession or to satisfy the physician and the patient at the risk of criticism, should he be unable to produce the film for medical or legal purposes at some future time.

A new photographic material called "Direct Duplicating Film" [1] is now available. With this film any number of exact duplicates can be produced from original roentgenograms by direct contact printing without the necessity of making an intermediate film with consequent loss of detail. The film has characteristics exactly opposite those of normal photographic film.

If developed by a safelight without having been exposed to light, Direct Duplicating film becomes entirely black, developing to maximum density. If, however, the film is completely exposed to white light and then developed, the film remains clear and transparent. This material forms a positive image directly from a positive, becoming clear and transparent when exposed to transparent areas of the film being copied, and becoming progressively darker and more opaque as the film to which it is exposed becomes darker and more opaque.

Developing, fixing and washing correspond in every way to the ordinary handling of any other film. Provided exposure and processing are correct, the duplicate will for practical purposes equal the original. The duplicating film is a so-called safety film.

In making a duplicate of a rpentgenogram it is possible to print a caption on the duplicating film, which may be an identification or may correspond to an official certification that the

From the X-Ray Department, Mount Sinai Hospital.

1. Agfa Ansco Corporation, Binghamton, N. Y.; available through General Electric Company.

film was taken during an examination made on a certain date by a certain person, and that the original film is on file at a designated hospital or radiologic clinic.

The possession of direct duplicates of roentgenograms would often allow the patient in accident insurance cases not only to recover the cost of examination but, through possession of adequate evidence, to guard against an unwarranted increase in premium at a later time.

In the course of a series of examinations for life insurance or for recording pathologic changes over a perod of time, duplicate x-ray films could be included with copies of the physician's report.

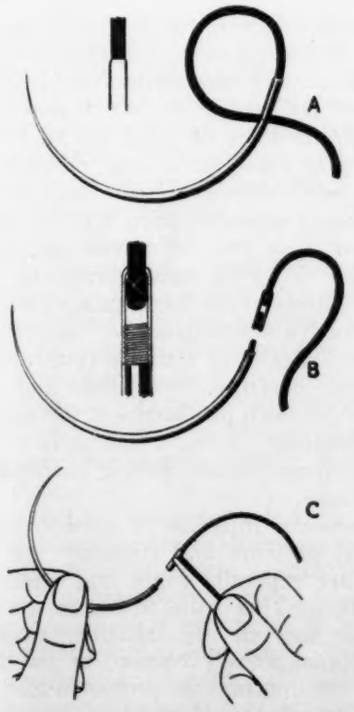
The roentgenologist seldom cares to give away the originals of rare films, and, because of the difficulties that formerly prevented satisfactory photographic reproduction of roentgenograms and the totally unsatisfactory nature of most printed reproductions, the widespread circulation and study of many valuable films has been impossible.

With Direct Duplicating films, satisfactory duplicates can at last be made and the duplicates circulated in medical and educational institutions like prints from an ordinary photograph. By printing the maker's signature on the duplicating film when the original roentgenogram is being reproduced, the duplicating film is acceptable as evidence in case of litigation.

SOLUTION OF THE NEEDLE AND THREAD PROBLEM

J. EASTMAN SHEEHAN, M.D., NEW YORK

For delicate suturing, the needle with an eye was larger at the head than in the shaft and so produced an aperture in the skin that was needlessly large. But its life was good for several threads. To overcome the major defect, the thread was inserted in the body of the needle, allowing shaft and head to be of one thickness. But the life of the needle was then the life of one thread.



A, needle, with suture thread and screw head assembled; *B*, parts separate; *C*, with forceps to attach and detach.

The needle here portrayed, of my design, readjusts the balance. The problem of dimension is solved by retaining the thread enclosed in the needle body. But when the thread has been used it may be discarded together with the fitting that holds it by the simple process of unscrewing that fixture. Another thread, with similar screw attachment, is then substituted, and the suturing goes on, without the needle even being withdrawn. This is repeated as long as the needle is sharp enough for its purpose, when a new or unfinished thread is attached to a new needle. About six threads can be so used with one needle, and the supply is arranged on that basis.

833 Fifth Avenue.

Special Article

DRUGS USED IN THE TREATMENT OF CIRCULATORY FAILURE IN ACUTE INFECTIOUS DISEASES

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NEW YORK

This is one of a series of articles written by eminent clinicians for the purpose of extending information concerning the official medicines. The twenty-four articles in this series have been planned and developed through the cooperation of the U. S. Pharmacopeial Committee of Revision and THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.—ED.

The discussion of the use of drugs in the treatment of the circulatory failure seen in acute infectious disease is fraught with difficulty because of the limitations of our knowledge of the mechanisms responsible for the failure. Clinically the usual type of failure appears to be due to loss of peripheral vascular tone, or a vasomotor paralysis. Much less commonly the evidence seems to point to a primary failure of the heart. In many instances both vasomotor and myocardial failure appear to participate to varying degrees. It is unfortunately not always possible clinically to assess the relative part played by either form of failure, so that treatment frequently cannot be based on a clear concept of the mechanism or mechanisms involved.

In bacterial endocarditis, acute rheumatic fever and diphtheria the heart is known to be damaged directly. But even in these diseases there is no unanimity of opinion as to the mechanism of the circulatory failure that may develop. In some cases it seems clearly to be of cardiac origin, and there are many clinicians who accept this as the established mechanism. The presence of cyanosis, congestion of the lungs, occasionally some dyspnea, and distention of the veins definitely indicates myocardial failure. But in most instances these are more or less masked by signs and symptoms referable to peripheral vascular failure. The latter include pallor, extreme weakness, sweating, decreased blood pressure, low pulse pressure and rapid, feeble pulse with poor heart sounds; these are the manifestations of shock or collapse. Because of the frequent presence of the latter symptoms, many believe that even in diphtheria, rheumatism and bacterial endocarditis, the circulatory failure usually is due to the participation of both cardiac and vasomotor mechanisms.

It is now generally accepted that the other acute infections cause little or no direct myocardial damage except the cloudy swelling common to febrile and infectious processes. The circulatory failure in these is concededly of the vasomotor type. The acceptance of this concept, however, does little to simplify the problem of treatment, since one or more of several factors

may be responsible for the failure of the vasomotor mechanisms. Despite extensive clinical and experimental investigations, knowledge of the various factors is still far from complete. Severe, acute dehydration may be produced by excessive sweating, vomiting or diarrhea, alone or in combination. It may cause a sufficient fall in blood volume to reduce the output of the heart so greatly that the vasomotor center begins to fail and thus initiates a rapidly fatal collapse. Unless promptly checked, this process may be complicated by the effects of toxins arising from dehydration itself as well as from the inadequate blood supply to the tissues. It is known that histamine and guanidine may be produced in excess under such circumstances. Through direct action on the blood vessels, these toxins may cause great vascular dilatation with secondary marked reduction in both blood pressure and cardiac output and either initiate or aggravate extreme circulatory collapse. It is probable in acute infections that yet other toxic substances may arise which can produce the vasomotor form of collapse.

The vasomotor center may remain functionally active, as has been demonstrated in the collapse produced in both pneumonia and diphtheria. In diphtheria there is reason to believe that the toxin may act directly on some portion of the splanchnic nerves to produce wide dilatation of the splanchnic blood vessels. This, in turn, may be sufficient to induce an excessive fall in blood pressure and a secondary depression of the vasomotor center as previously described. Finally, it is known that acute circulatory collapse may be caused by reflexes acting through the central nervous system, and it is possible that similar effects may be produced through the direct action of toxins arising in the course of some of the acute infections such as meningitis.

The preceding brief review of some of the more likely mechanisms that may be involved in the causation of circulatory failure and the great difficulty of reaching a correct mechanistic diagnosis justifies the contention that most of the treatment recommended is largely empirical. Christian[1] is right in his statement regarding the treatment of circulatory failure when he says "Of those recovering, more get well than are cured." The following discussion of drugs is presented in the light of the foregoing review of the problems.

Caffeine is probably the most widely used drug. Its actions are diverse and not very readily controllable. Through direct stimulation of the higher portions of the central nervous system, it may diminish the patient's exhaustion and improve his sense of well being. By direct action on the medullary centers, it stimulates respiration and to a variable extent also stimulates the vasomotor center and may tend thereby to raise the blood pressure and improve vascular tone. Through direct action on the heart muscle it may raise its tone, increase both the strength and completeness of its systole, promote diastolic relaxation, and, if it does not cause too much acceleration in the heart rate, may result in an increase of the cardiac output. These actions may be further enhanced by some improvement of the coronary circulation by a specific dilatation of those vessels. On the other hand, in susceptible individuals or when the dose is too large it may prove harmful by causing mental excitement, insomnia and marked irritability. Large doses may also produce harmful tachycardia and directly impair cardiac output by diminishing diastolic relaxation. If either of these detrimental effects is produced, its administration should be stopped or the dose reduced. It is generally best administered hypodermically in the form of a sterile solution of Caffeine with Sodium Benzoate. The average single dose lies between 0.3 and 1 Gm. Its frequency of repetition should be guided by its effectiveness and the presence of indications for its further administration rather than on any arbitrary schedule. Its action usually lasts about two hours but seldom for much longer. It should be regarded as an emergency remedy and its use stopped when it is no longer needed. It may be administered intravenously by slow injection through a small needle. Its rapid injection is distinctly dangerous. The other purine derivatives, such as theophylline and its compounds and theobromine, are too feeble as compared to caffeine in their actions as cardiac and vasomotor stimulants to be of value in the treatment of circulatory failure.

Strychnine is believed by some to be valuable, by others to be useless. If it is to be used it should be administered in doses much larger than are commonly employed. At least 0.002 Gm. is required, and single doses of from 0.003 to 0.006 Gm. are more certainly effective. It should be administered hypodermically. The dose may have to be repeated every three to six hours. The patient should be observed closely for the possible appearance of reflex hyperexcitability. Its mode of action is chiefly indirect as a result of increased nerve irritability, which enhances the tone of the heart and blood vessels. Its administration is unfortunately without benefit unless it is employed in doses verging on the toxic, and many of the failures have been due to the fear of giving it in adequate doses.

More certainly effective than any other agent for the promotion of peripheral vasoconstriction is epinephrine. This should be administered in the form of the solution of Epinephrine Hydrochloride, which may be injected intramuscularly in doses of from 0.6 to 1 cc., or the same doses can be made much more effective, yet safe, if injected slowly and continuously into a vein. For the latter mode of administration 1 cc. of the solution may be added to a liter of physiologic solution of sodium chloride or to the same volume of 5 per cent solution of dextrose. By these procedures one combines the prolonged maintenance of vasoconstriction at a readily controllable level with the restoration of both fluid and salt or dextrose. Both fluid and salt are of great value when much has been lost through diarrhea, vomiting or sweating. From 1 to 3 liters of such solutions may be infused slowly during twenty-four hours in desperate cases.

The intramuscular injection of epinephrine may elevate the blood pressure and stimulate the heart, but these effects are generally slight and inadequate, and of brief duration. This is due to the intense local vasoconstriction at the site of injection, which further impairs absorption already reduced by the failing circulation. Absorption may be promoted and the action of the drug somewhat prolonged by occasional massage of the site of injection. The actions of epinephrine can occur only after absorption into the blood stream and they are of short duration unless the drug is supplied in adequate concentration either continuously or at brief intervals. It is theoretically the best of all available drugs for use in peripheral circulatory failure, for it acts directly on the endings of the vasomotor nerves to produce vascular constriction and elevation of blood

1. Christian, H. A.: The Diagnosis and Treatment of Diseases of the Heart, Oxford University Press, p. 53.

pressure, and at the same time it stimulates the heart through the sympathetic nerve mechanism as well as by a probable direct action on the myocardium. It is contraindicated in those patients whose blood volume has been much reduced by loss of water through diarrhea or sweating. This is because vasoconstriction takes place as a natural compensatory mechanism under such circumstances. If this constriction passes an optimal degree, it aggravates the circulatory failure by interfering with return flow to the heart and thus further reduces the heart's minute volume output. Its use in improperly selected cases may aggravate the condition to relieve which it was given.

Both Ephedrine and Solution of Posterior Pituitary have vasoconstrictor actions which result in some elevation of the blood pressure. Their actions can be secured by subcutaneous or intramuscular administration if the circulation is adequate to permit their absorption. Hence they are best used at the inception of circulatory failure, or even prophylactically when its development seems imminent. Unfortunately, in actual practice they have not proved either of much value or very trustworthy, and the too frequent repetition of pituitary may lead to depression of the tone of the vasoconstrictor system with resulting fall in blood pressure. Ephedrine Sulfate or Hydrochloride may be used in single doses of from 0.03 to 0.1 Gm. for an adult. It may be repeated according to the patient's needs, but frequent or large doses often cause rather excessive nervousness and sometimes produce vomiting. Pituitary is best given in a single dose of from 0.5 to 1 cc. of the official solution. This may be repeated at intervals of one to four hours; but it is seldom either wise or necessary to repeat more than two or three times, as further doses rarely prove of value.

Digitalis and strophanthin are of no value in the forms of collapse not due to failure of the myocardium. They are, in fact, often harmful and should be regarded as definitely contraindicated. Even in those instances in which circulatory failure appears primarily due to cardiac failure, however, these agents usually prove worthless. This may be ascribed to their inadequate absorption, to their inability to offset the more powerful actions of the toxins already influencing the heart, to the fact that the heart in such patients is too severely damaged to respond to any stimulation, or to the simultaneous presence of peripheral vascular failure. Whatever the true explanation, the fact remains well established that members of the digitalis group of drugs are either contraindicated in the circulatory failure of acute infections or prove wholly ineffective in its attempted control.

Camphor and the unofficial substitutes, such as cardiazol or homocamfin, are too untrustworthy to deserve mention. Whatever stimulant actions they may occasionally produce are chiefly on the respiratory center or reflexly through local irritation of the tissues at the site of administration. Even these slight actions are too fleeting to be of any considerable value.

Experience seems to indicate that the most promising plan of treatment should include one or more of the following procedures in addition to such preventive measures as the provision of rest, adequate and balanced diet, sufficient fluids during the course of the acute illness, and the administration of oxygen by nasal catheter or tent when indicated by the presence of cyanosis, anemia or anoxemia. From 50 to 100 cc. of 50 per cent dextrose solution should be administered intravenously once or twice in twenty-four hours. Caffeine or strychnine, as previously discussed, should be injected promptly at the first evidence of failure. If the loss of fluid and salt has been excessive, slow intravenous infusions of physiologic solution of sodium chloride should be given in amounts of 1 to 2 liters. The heart will not be overtaxed by too large a volume of fluid if the injection is stopped at the beginning of a rise in the venous pressure, which now can be measured easily by the direct manometric method. In cases associated with intense diarrhea, infusions of not over 300 cc. of a 5 per cent solution of sodium chloride may be most valuable. Transfusions of blood, if feasible, may help materially. Only when these measures are unavailing is it wise to resort to the addition of epinephrine to the transfusion or the simultaneous injection of either ephedrine or posterior pituitary.

125 East Seventy-Fourth Street.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

THE PRESENT STATUS OF FEVER THERAPY PRODUCED BY PHYSICAL MEANS

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During the past year, interest in the production of fever by physical means has greatly increased. More than a hundred articles on the subject have been written during 1935.

METHODS OF TREATMENT

Artificial fever has been induced by means of the following physical agents:

Radiant Heat.—The air conditioned cabinet is the most recent development in this field. Although these cabinets do not produce a rise in bodily temperature by direct application of radiant heat to the surface of the body but rather by the heating of circulated air, which is blown over the body, they may still be classed as radiant heat devices. The hyperpyrexia is produced by the heated air. Much excellent clinical work has been done with this type of apparatus during the past year. The construction of this device has been described by various investigators.[1] The device is elaborate, requires a skilled team of workers for its operation and is not on the market at present. There are approximately fifty-five of these cabinets scattered throughout the country at various medical centers for purposes of clinical research.

Atsatt and Patterson [2] have described a device for the production of artificial fever by means of conditioned air, which they stated could be constructed by any competent hospital engineer at a cost that was considerably under $100. They described this device in detail so that it can be reproduced by following their diagrams and description.

From the Section on Physical Therapy, the Mayo Clinic.

1. Krusen, F. H.: A Recently Developed Method of Artificial Fever Production by Physical Means, M. Rec. **140**: 248-250 (Sept. 5) 1934. Kendall, Webb and Simpson.[3] Sittler.[4]

2. Atsatt, R. F., and Patterson, L. E.: Fever Therapy Apparatus, Arch. Physical Therapy **18**: 108-110 (Feb.) 1936.

Luminous Heat Cabinets.—Such cabinets have been used for the production of fever.[3] These cabinets do not possess the features of air humidification and air circulation found in the previously mentioned cabinet. Bishop, Lehman and Warren,[3] who described the luminous heat cabinet, stated that "humidity control of the air in the radiant energy cabinet was investigated and was found to be of little benefit in the set-up described, especially in view of the complications that it imposed." It has been my experience, however, that the lack of proper humidification is somewhat of a disadvantage. There is one other disadvantage in this cabinet as described by the men who devised it; that is, the heat insulation of the cabinet is insufficient. Bishop, Lehman and Warren,[3] however, stated that the radiant energy method described seemed to be the most convenient and economical method in their experience. They also stated that the cost of their cabinet was approximately $150 and they gave an excellent description of its construction in their article.

It is likewise worth noting that Johnson, Osborne and Scupham [4] believed that the ordinary electric light cabinet was the safest method for the production of artificial fever by physical means.

Nonluminous Heat Cabinets.—There have been marketed by various manufacturers cabinets which somewhat resemble the one described by Bishop, Lehman and Warren,[3] with the exception that the cabinets are heated by resistance heat coils somewhat similar to the coils found in the familiar household electric heater. Some of these devices have been humidified by means of a water trough within the cabinet. This method of humidification, however, is most unsatisfactory. None of these devices have yet been accepted by the Council on Physical Therapy as a satisfactory device for the production of fever.

Electric Blankets.—Various kinds of electric blankets, frequently constructed somewhat like a large sleeping bag, have been used for fever therapy. They are less expensive than the cabinets, but a great disadvantage is that the patient is closely confined by the blanket. Kuhns,[5] after four years of trial, expressed the opinion that the electric blanket is "the simplest and safest form of fever producing agent." These electric blankets, however, may be used satisfactorily only in those cases in which a fever of not over 103 to 104 F. is required. For higher temperatures than this they are not at all satisfactory. The patients are made most uncomfortable by the close confinement of the blanket.

High Frequency Electrical Method.—This method of treatment, first described in 1929,[6] is still being used, although it has been replaced to a certain extent by recently developed devices. The ordinary diathermy machine is used and large metal electrodes are applied to the patient's skin in such a manner that a large region of the body is traversed by the high frequency current. The patient is then covered by blankets or placed in a sleeping bag or a heat cabinet to prevent dissipation of the heat produced in the body by the high frequency current.

Short Wave Diathermy.—The short wave diathermy machine is somewhat similar to the conventional diathermy machine with the exception that the oscillations of current are much more rapid (conventional diathermy machines produce approximately 2,000,000 oscillations per second as compared to short wave diathermy machines, which may produce 100,000,000 or more oscillations per second). The heating of the body of the patient may be produced either by the induction coil or by the condenser plate method. With the induction coil method a coil of heavily insulated wire or ribbon is attached to the machine. This coil is either wound around the nude body of the patient or placed close to the surface of the patient's body in the form of a large pancake, and the patient is then heated by means of the high frequency electromagnetic field that is produced. Insulation of the patient's body is accomplished by means of blankets, a zipper bag or an insulated cabinet. One such method has been described by Kimble, Holmquest and Marshall.[7]

With the condenser plate method essentially the same arrangement is used as with the induction coil technic, with the exception that the coil is replaced by two large condenser plates, which are placed on each side of the patient in such a manner that a large portion of the patient's body is within an electrostatic field between the plates. The body is then heated by the high frequency waves that pass between the two plates. Insulation of the patient's body is accomplished as previously mentioned.

One of the disadvantages of short wave diathermy is the tendency for the production of burning sensations on the moistened skin when the patient begins to perspire. In addition, when the patient assumes a posture in which two surfaces of the skin are touched together very lightly, burning is likely to occur at the site of contact. For this reason a number of investigators [8] have abandoned the use of high frequency currents in favor of some form of external heat cabinet.

Hydrotherapeutic Methods.—Hot Tub Baths: The production of fever with hot baths, which was described by Phillips in 1883, by Schamberg and Tseng in 1927, and by Mehrtens and Pouppirt in 1929, is still being used successfully by some investigators. Although prolonged hot tub baths are depressing, nevertheless the patient's temperature may be raised rather rapidly, and it may be maintained at a fairly high level for an hour or two by this method alone. The hot tub bath may be used to induce artificial fever, the fever being maintained, after induction, by means of blankets or a very simple radiant heat cabinet.

Hot Spray Baths: The nude patient may be placed in a horizontal position in a cabinet similar in external construction to the radiant heat cabinet and he may then be sprayed with a series of very fine jets of nebulized, very hot water, the temperature of which is controlled by means of a thermostat. Such a spray cabinet will produce a rapid rise in bodily temperature if the temperature of the water can be maintained at the proper degree. Difficulty may be encountered in maintaining the bodily temperature at the necessary high level in such a device.

3. Bishop, F. W.; Lehman, Emmy, and Warren, S. L.: A Comparison of Three Electrical Methods of Producing Artificial Hyperthermia, J. A. M. A. **104**: 910-915 (March 16) 1935.

4. Johnson, C. A.; Osborne, Stafford, and Scupham, George: Studies of Peripheral Vascular Phenomena, Am. J. M. Sc. **190**: 485-491 (Oct. 1) 1935.

5. Kuhns, R. H.: The Present Status of Fever Therapy for Dementia Paralytica in the State Hospitals of Illinois, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 96-97.

6. Neymann, C. A., and Osborne, S. L.: Artificial Fever Produced by High Frequency Currents: Preliminary Report, Illinois M. J. **56**: 199-200 (Sept.) 1929.

7. Kimble, H. E.; Holmquest, H. J., and Marshall, J. G.: Electropyrexia with the Inductotherm, Physiotherapy Rev. **15**: 14-16 (Jan.-Feb.) 1935.

8. Kendell, H. W.; Webb, W. W., and Simpson, W. M.: Artificial Fever Therapy of Gonorrheal Arthritis: Report of Thirty-One Cases, Am. J. Surg. **29**: 428-435 (Sept.) 1935. Bishop, Lehman and Warren.[3]

Conduction Heat Methods Other Than the Foregoing.—Epstein and Cohen[9] have devised a simple method of inducing hyperpyrexia by wrapping the patient in blankets and rubber sheeting. With this method no source of heat other than the natural heat radiation of the body is utilized. However, a period of four or five hours is necessary simply to raise the temperature to 104 F., which would seem to subject the patient to an unnecessarily long period of discomfort before the required high temperature is achieved. If this method is to be used, it would seem expedient to use at least a few hot water bottles incorporated in the wrappings of the patient in order to make the induction of fever more rapid and to relieve the patient of several hours of unnecessary discomfort.

Hot Water Bottle and Blanket Method.—Haddon and Wilson[10] described this method which is still used quite frequently. The patient is simply wrapped in a number of thick blankets and surrounded by hot water bottles. The great disadvantage of any blanket method rests in the fact that nearly all patients are made extremely uncomfortable by the confinement of their limbs by the necessary tight wrapping of so many heavy coverings.

DISEASES TREATED

It is amazing to find that during the past year the use of fever produced by physical means has been recommended for no less than fifty different diseases. The results in the treatment of the majority of these diseases have not been encouraging, although for a selected few the method of treatment has given promise of great usefulness. In 1935 artificial fever produced by physical means was used in the treatment of the following conditions: adiposis dolorosa,[11] allergic dermatitis,[12] arteriosclerosis,[11] bacterial endocarditis (subacute),[13] bronchial asthma,[14] bronchiectasis,[15] Buerger's disease,[16] cerebral atrophy (with chronic otitis media),[17] chorea,[18] chronic sinusitis,[19] dermatitis herpetiformis,[20] epidemic encephalitis,[21] epilepsy,[12] "gallbladder infections,"[11] gonorrhea,[22] gonorrheal arthritis,[23] gonorrheal corneal ulcer,[24] gonorrheal endocervicitis,[25] gonorrheal epididymitis,[26] gonorrheal prostatitis,[27] gonorrheal salpingitis,[28] gonorrheal urethritis,[27] pelvic inflammatory disease,[29] "hepatic infections,"[11] Hodgkin's disease,[12] infectious arthritis,[30] interstitial keratitis,[31] iritis (subacute),[32] multiple sclerosis,[33] mycosis fungoides,[34] optic atrophy,[11] osteogenic sarcoma,[35] osteomyelitis,[17] Parkinson's syndrome,[36] peripheral vascular disease,[37] psoriasis,[38] psychoses,[39] pyelitis,[40] radiculitis,[11] Raynaud's disease,[11] rheumatic fever,[19] sciatic neuritis,[19] scleroderma,[41] septicemia (staphylococcic),[17] syphilis,[42] syphilitic meningitis,[11] ocular syphilis,[43] syphilis of the nervous system,[44]

9. Epstein, N. N., and Cohen, Maurice: The Effects of Hyperpyrexia Produced by Radiant Heat in Early Syphilis, with a Description of a Simple Method of Producing Hyperpyrexia, J. A. M. A. **104:** 883-889 (March 16) 1935.

10. Haddon, S. B., and Wilson, George: Thermic Treatment of Neurosyphilis, Pennsylvania M. J. **36:** 829-831 (Aug.) 1933.

11. Rogers, J. C.: Some Further Studies and Observations of Hyperthermia (Fever Treatment) Cases, Kentucky M. J. **33:** 149-151 (March) 1935.

12. Desjardins, A. U., and Popp, W. C.: Our Experience with Fever Therapy, Abstract Papers and Discussions Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 7-8.

13. Simmons, E. E.: Some Unusual Cases Treated with the Kettering Hypertherm, Abst. Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 20-21. Freund and Watts.[49]

14. Sheldon, J. J.: Results of Fever Therapy in Intrinsic Intractable Asthma: Preliminary Report, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 83-85. Rogers.[11] Desjardins and Popp.[12] Hefke.[40]

15. Bennett and Austin.[19] Simmons.[13]

16. Rogers.[11] Desjardins and Popp.[12] Ebaugh, Barnacle and Ewalt.[17] Freund and Watts.[37]

17. Ebaugh, F. C.; Barnacle, C. H., and Ewalt, J. R.: Experience with Fever Therapy at the University of Colorado School of Medicine and Hospitals, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, p. 17.

18. Schnabel, T. C., and Fetter, Ferdinand: Fever Therapy in Gonorrheal Arthritis and Chorea, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 36-37. Hoverson, E. T.: The Use of the Electric Cabinet as the Source of Heat for the Production of Artificial Fever in the Treatment of General Paresis and Chorea, ibid., pp. 97-98. Sutton, Lucy P., and Dodge, Katharine G.: The Effect of Fever Therapy on Rheumatic Carditis Associated with Chorea, J. Pediat. **6:** 494-511 (April) 1935. Neymann, C. A.: Treatment of Disease by Means of Electropyrexia, Proc. Roy. Soc. Med. **29:** 151-162 (Dec.) 1935. Wetchler, Samuel: Chorea in Children, M. Rec. **142:** 30-33 (July 3) 1935. Rogers.[11] Desjardins and Popp.[12] Metz.[21] Peck.[38] Ebaugh, Barnacle and Ewalt.[17]

19. Bennett, A. E., and Austin, Bruce: Preliminary Report of the University of Nebraska Research Project, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 23-24.

20. Alderson, H. E.: Fever Therapy in Dermatitis Herpetiformis, Arch. Dermat. & Syph. **32:** 468-469 (Sept.) 1935.

21. Desjardins and Popp.[12] Bennett and Austin.[19] Ebaugh, Barnacle and Ewalt.[17]

22. Hench, P. S.: A Clinic on Some Diseases of Joints: I. Gonorrheal Arthritis: Results of Fever Therapy; II. Acute Postoperative Arthritis: Its Identification; III. Acute Postoperative Gout: Its Treatment and Prevention; IV. The Inactivating Effect of Jaundice in Chronic Infectious (Atrophic) Arthritis and Fibrositis, M. Clin. North America **19:** 551-583 (Sept.) 1935. Desjardins and Popp.[12] Ebaugh, Barnacle and Ewalt.[17] Boak, Carpenter and Warren.[46]

23. Hench, P. S.; Slocumb, C. H., and Popp, W. C.: Results of Fever Therapy for Gonorrheal Arthritis, Chronic Infectious (Atrophic) Arthritis and Other Forms of "Rheumatism," Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 9-13. Kendell, H. W., and Webb, W. W.: Artificial Fever Therapy of Gonorrheal Arthritis: Report of Thirty-One Cases, ibid., pp. 108-110. Stecher, R. M.: Results of Fever Therapy in Acute and Chronic Arthritis, ibid., pp. 13-14. Rogers.[11] Anderson, Arnold and Trautman.[55] Schnabel and Fetter.[18] Peck.[38] Egan and Piaskoski.[26] Hench.[22] Hench, Slocumb and Popp.[72]

24. Whitney, E. L.: Artificial Fever Therapy in the Treatment of Corneal Ulcer and Acute Iritis, J. A. M. A. **104:** 20-1794-1797 (May 18) 1935. Metz.[21] Simpson.[70]

25. Bierman, William, and Horowitz, E. A.: Gonococcal Infection in the Female Treated by Means of Combined Systemic and Additional Pelvic Heating, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 30-31.

26. Egan, W. J., and Piaskoski, Ray: A Preliminary Report on Early Experiences with the Kettering Hypertherm at the Milwaukee County Hospital, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 62-63. Anderson, Arnold and Trautman.[55]

27. Desjardins, A. U.; Stuhler, L. G., and Popp, W. C.: Fever Therapy for Gonococcic Infections, J. A. M. A. **104:** 873-878 (March 16) 1935. Anderson, Arnold and Trautman.[55]

28. Egan and Piaskoski.[26] Bierman and Horowitz.[25]

29. Huber, C. P.: Fever Therapy in Gynecology; a Preliminary Report of Immediate Results, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 81-82. Hefke.[40] Metz.[21] Ebaugh, Barnacle and Ewalt.[17] Bierman and Horowitz.[25] Desjardins, Stuhler and Popp.[27]

30. Hench, P. S.: Clinical notes on the results of fever therapy in different diseases, Proc. Staff Meet., Mayo Clin. **10:** 662-666 (Oct. 16) 1935. Tenney, C. F., and Snow, W. B.: Therapeutic Effects of Electrically Produced Fever in the Treatment of Arthritis, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 46-51. Short and Bauer.[57] Desjardins and Popp.[12] Hefke.[40] Peck.[38] Ebaugh, Barnacle and Ewalt.[17] Hench, Slocumb and Popp (footnotes 23 and 72). Stecher.[23]

31. Metz, M. H.: Some Unusual Cases Treated with Fever Therapy, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 101-103. Peck.[38] Culler.[43]

32. Bennett and Austin.[19] Whitney.[24]

33. Neymann, C. A.: L'emploi de l'éctropyrexie dans le traitment des maladies, Liége méd. **28:** 641-664 (June 9) 1935. Desjardins and Popp.[12] Bennett and Austin.[19] Hefke.[40]

34. Klauder, J. V.: Fever Therapy of Mycosis Fungoides, J. A. M. A. **106:** 201-205 (Jan. 18) 1936. Peyri, Jacques: Quelques commentaires à notre casuistique de mycosis fungoides, Ann. de dermat. et de syph. **6:** 481-495 (June) 1935. Desjardins and Popp.[12]

35. Doub, H. P.: Osteogenic Sarcoma Treated with Radiation and Fever Therapy, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 77-78.

36. Rogers.[11] Hefke.[40] Riesman.[41]

37. Freund, H. A., and Watts, F. B.: The Treatment of Peripheral Vascular Disease by Means of Hyperpyrexia, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 85-86.

38. Peck, W. S.: Organization of Fever Therapy Studies at the University Hospital, University of Michigan, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 78-80. Rogers.[11]

39. Bennett and Austin.[19] Simmons.[13]

40. Hefke, H. W.: Report on the First Year of Fever Therapy at the Milwaukee Hospital, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 29-30.

41. Desjardins and Popp.[12] Metz.[21]

42. Krusen, F. H.: Therapeutic Fever with High Frequency Current in Treatment of Syphilis, Physiotherapy Rev. **12:** 288-289 (Nov.-Dec.) 1932. Epstein and Cohen.[9] Simpson.[70] Tenney and Snow.[30]

43. Culler, A. M.: Artificial Fever Therapy of Ocular Syphilis, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 105-106.

44. Gordon, R. G., and Gerhard, Jacoby: General Paresis: Treatment with Diathermy, Delaware State M. J. **7:** 102-104 (May) 1935. Meninger, W. C.: Juvenile Paretic Studies, Am. J. Syph. & Neurol. **19:** 257-271 (April) 1935. Nelson, O. L.: Diathermy in the Treatment of Neurosyphilis, M. Bull. Vet. Admin. **11:** 223-238 (Jan.) 1935. Kuhns.[5] Simmons.[13] Hefke.[40] Ebaugh, Barnacle and Ewalt.[17] Hoverson.[18] Egan and Piaskoski.[26] Simpson.[70] Hinsie and Blalock.[62] Solomon and Epstein.[66] Cullins, Morgan and Seymour.[63]

trichinosis,[45] tuberculosis,[46] tumors [47] and undulant fever.[48]

I wish to emphasize most strongly that it is probable that fever therapy is of little or no value in the treatment of a number of these diseases and that in some diseases mentioned it is distinctly dangerous to attempt fever therapy. Studies during the past year have added to our information concerning the use of artificial fever in some diseases.

Subacute Bacterial Endocarditis (Endocarditis Lenta).—Studies [49] have demonstrated very definitely that, although there was apparently some slight temporary relief of pain and lowering of temperature following artificial fever therapy, no permanent beneficial effects were noted in any case. Because of the presence of soft vegetations on the endocardium, the very marked increase in blood velocity produced by fever therapy apparently increases the danger of embolism. Either cerebral embolism or generalized embolism may occur. Freund and Watts [49] have demonstrated definitely that Streptococcus viridans can resist the very highest temperature that the human body can tolerate. These results constitute a warning to abandon any further attempt to use fever therapy in subacute bacterial endocarditis.

Bronchial Asthma.—Studies [50] indicate that in a total of at least 117 cases the results were favorable in 104 cases, unfavorable in ten cases and slight or indifferent in at least three other cases. These results would seem to indicate that well equipped hospital fever therapy departments are justified in continuing to administer fever therapy to patients who have intractable bronchial asthma which has failed to respond to all other means of treatment. However, the beneficial results are frequently merely temporary and in some instances no improvement can be expected. Because of the severity of the treatment, fever therapy should not be attempted unless all other means have failed. In no instance should fever therapy be attempted as an office procedure.

Chorea.—Reports [51] indicate that, of approximately thirty patients, eight have been classed as "cured," seven as markedly improved, eleven as improved, none as unimproved, and in four or more cases the results have not been reported. The total number of such cases is too small for one to draw any final conclusions. It would seem that none but well equipped institutions which are conducting studies on the effects of artificial fever therapy should attempt to use this method of treatment until further studies have been presented.

Gonococcic Infections.—Studies [52] indicate that in 187 cases of gonorrhea approximately 121 patients were clinically "cured" and twenty-eight were improved. In four cases results were not reported. These figures seem to be startlingly good. Despite the severity of this type of treatment, its use by properly organized teams of workers in well equipped institutions seems justified in cases in which there is no contraindication to fever therapy.

Gonorrheal Arthritis.—Studies [53] reveal that, with one exception, all investigators reported startlingly good results in the treatment of gonorrheal arthritis with artificial fever by physical means. These early reports reveal that after treatment with artificial fever 70 per cent of the patients who had gonorrheal arthritis were symptom free, an additional 10 per cent were markedly relieved, and the other 20 per cent were unimproved. The studies indicate that the earlier in the course of the arthritis the treatment is given the greater is the opportunity for complete subsidence of the infection and for nearly complete restoration of articular function.

Gonorrheal Complications Other Than Arthritis.—Studies on gonorrheal corneal ulcer,[54] gonorrheal endocervicitis,[25] gonorrheal prostatitis,[55] gonorrheal salpingitis [25] and gonorrheal pelvic inflammatory disease [56] indicate that if proper technic is employed these complications will respond favorably to prolonged, high artificial fevers.

Infectious Arthritis.—The work of various investigators [57] shows that about 30 per cent of the patients with infectious arthritis who were treated with artificial fever were significantly improved and that about 70 per cent showed little if any improvement.

Multiple Sclerosis.—Several investigators [58] reported the treatment of this condition with induced fever. The results were for the most part unfavorable but the number of cases reported is insufficient to permit the drawing of any final conclusions.

Mycosis Fungoides.—Reports [59] signify that, in ten cases of mycosis fungoides in which artificial fever therapy was employed, moderate and temporary improvement was noted in eight. In one case the treatment had to be discontinued because of an intercurrent, severe herpes zoster, and in another case the treatment was "of no avail."

Parkinson's Syndrome.—Hefke [40] and Rogers [11] reported the treatment of this condition with fever therapy, and Schmidt [60] had previously advocated fever therapy for the treatment of the postencephalitic type of this syndrome. It would probably be best to heed the statement of Riesman;[61] namely, that "fever therapy in the form of diathermy or malarial or bacterial injections seems to produce no permanent benefit. It may even do harm."

45. Krusen, F. H.: Studies of the Blood Picture Before and After Fever Therapy, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 91-96.

46. Benjamin, J. E.: One Year's Experience in the Use of the Kettering Hypertherm at the Cincinnati General Hospital, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 99-100. Major, R. C.; Doub, H. P., and Hartman, F. W.: The Effect of Accurately Controlled Artificial Fever on Acute Tuberculosis, ibid., pp. 63-66. Metz.[31] Duncan and Mariette.[67]

47. Warren, S. L.: Study of Effect of Artificial Fever in Hopeless Tumor Cases, Am. J. Roentgenol. & Radium Therap. **33:** 75-87 (Jan.) 1935. Doub.[45]

48. Simmons.[12] Prickman and Popp.[65]

49. Freund, H. A., and Watts, F. B.: The Treatment of Subacute Bacterial Endocarditis with Excessive Hyperpyrexia, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 86-87.

50. Desjardins and Popp.[12] Hefke.[40] Phillips and Shikany.[69] Sheldon.[14]

51. Desjardins and Popp.[12] Schnabel and Fetter.[18] Metz.[31] Hoverson.[18] Sutton and Dodge.[16] Neymann.[18] Wetchler.[16]

52. Warren, S. L.; Carpenter, C. M., and Boak, Ruth A.: The Basic Principles for the Cure of Gonococcal Infections by a Single Fever Treatment, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 5-6. Desjardins and Popp.[12] Boak, Carpenter and Warren.[61]

53. Hench, P. S.: Clinical Notes on the Results of Fever Therapy in Different Diseases, Report of the Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, Minnesota Med. **19:** 151-156 (March) 1936. Strickler, C. W. Jr.: Results of Treatment of Arthritis with Fever Therapy: A Preliminary Report, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, p. 83. Kendell, Webb and Simpson.[8] Anderson, Arnold and Trautman.[55] Schnabel and Fetter.[18] Hench.[23] Hench, Slocumb and Popp (footnotes 23 and 72). Kendell and Webb.[23]

54. Metz.[31] Whitney.[24]

55. Anderson, T. B. H.; Arnold, R. C., and Trautman, J. A.: The Treatment of Gonococcal Infections in the Male with Pyretotherapy, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 33-34.

56. Bierman and Horowitz.[25] Huber.[20]

57. Short, C. L., and Bauer, Walter: Treatment of Rheumatoid Arthritis with Fever Induced by Diathermy, J. A. M. A. **104:** 2165-2168 (May 18) 1935. Hefke.[40] Hench, Slocumb and Popp.[72] Stecher.[23] Hench.[23] Strickler.[53] Tenney and Snow.[20]

58. Desjardins and Popp.[12] Bennett and Austin.[19] Hefke.[40] Neymann.[18]

59. Klauder.[24] Peyri.[24]

60. Schmidt, W. H.: Fever Therapy and Other Recent Developments in Physical Therapy, New England J. Med. **209:** 419-425 (Aug. 31) 1933.

61. Riesman, David: Encephalitis Lethargica, with Report of Cases, Ann. Surg. **101:** 303-312 (Jan.) 1935.

Syphilis (Early).—Studies [62] indicate that artificial fever therapy combined with chemotherapy affords better results than can be obtained with the use of either one alone. Simpson [70] advocates the use of fever therapy in the treatment of primary syphilis as well as in the later stages. In a recent article, Neymann and others [62] have discussed pertinently the value of artificial fever by physical means. In the late stages of syphilis most of the studies have been made on the usefulness of fever therapy in the treatment of syphilis of the nervous system and in the treatment of ocular syphilis.

Ocular Syphilis.—Studies [63] indicate that the combined fever-chemotherapy technic of Simpson is of considerable value in the treatment of some forms of ocular syphilis, particularly interstitial keratitis, syphilitic exudative uveitis and choroiditis.

Syphilis of the Nervous System.—Reports [63] indicate that fever produced by physical means may be used successfully in the treatment of dementia paralytica, tabes dorsalis and other forms of syphilis of the central nervous system. The studies suggest that physical methods of creating fever produce results somewhat comparable to those obtained with malarial therapy. The data, however, are still insufficient to permit one to draw final conclusions.

Tuberculosis.—Investigations [64] indicate that artificial fever should be employed with the greatest of care even in experimental studies. There is great danger of doing injury to the patient if fever therapy is used in this disease and the study of this phase of treatment of tuberculosis should, for the present, remain entirely in the hands of research groups.

Undulant Fever.—Prickman and Popp [65] have noted rather striking response to fever therapy in three patients who had undulant fever. I have recently treated a fourth patient who has shown a sudden and very spectacular remission of the chills and fever following three sessions of high fever artificially produced. The number of patients is insufficient for one to draw any final conclusions with regard to this disease.

Conclusions with Regard to Diseases Treated.—The studies which have been made during the last year indicate that the chief sphere of usefulness of this form of therapy lies in the treatment of gonorrhea, both acute and chronic, and its complications. It would appear that it may be of value in the treatment of syphilis in its various manifestations, particularly when fever therapy is combined with chemotherapy. While there is a suggestion that artificial fever produced by physical means may be helpful in the treatment of intractable bronchial asthma in selected cases of chronic infectious arthritis, chorea and undulant fever, nevertheless clinical data are not sufficient to permit any final conclusions. Its value in about forty other diseases remains to be proved. It seems to offer promise of considerable usefulness as a therapeutic agent particularly in the treatment of gonorrhea.

62. Neymann, C. A.; Lawless, T. K., and Osborne, S. L.: Treatment of Early Syphilis by Electropyrexia, J. A. M. A. **107:** 194-200 (July 18) 1936. Epstein and Cohen.[9] Simpson.[70]

63. Hinsie, L. E., and Blalock, J. R.: Treatment of General Paresis with Combined Electropyrexia and Tryparsamide, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 26-29. Solomon, H. C., and Epstein, S. H.: Experiments with Tryparsamide, Malaria and Diathermy, ibid., pp. 35-36. Cullins, J. G.; Morgan, H. P., and Seymour, W.: Superdiathermy in Treatment of Dementia Paralytica, M. Bull. Vet. Admin. **11:** 217-223 (Jan.) 1935. Kuhns.[5] Simmons.[13] Hefke.[40] Hoverson.[18] Egan and Piaskoski.[36] Simpson.[70] Gordon and Gerhard.[41] Menninger.[46] Nelson.[44]

64. Metz.[21] Benjamin.[48] Duncan and Mariette.[67] Major, Doub and Hartman.[45]

65. Prickman, L. E., and Popp, W. C.: Treatment of Brucellosis by Hyperpyrexia Induced by the Simpson Kettering Hypertherm, Proc. Staff Meet., Mayo Clin. **11:** 506-510 (Aug. 5) 1936.

EFFECTS

A summary of the numerous studies on the effects of fever produced by physical means indicates that the following changes are produced:

Bactericidal Effects.—Neisseria gonorrhoeae generally is destroyed at a temperature of from 106 to 107 F. in from six to twenty-seven hours.[66] In a high percentage of cases of syphilis, darkfield illumination will fail to reveal the presence of Spirochaeta pallida after the patient has been treated with fever induced by physical means.[9] Following exposure to temperatures within physiologic ranges, no cultural changes, in vitro, are noted in Mycobacterium tuberculosis, Streptococcus haemolyticus or Streptococcus mitior.[67] The last named organism appears to resist, in vivo, any degree of heat possible for the human body to tolerate.[49] Micrococcus catarrhalis, Haemophilus conjunctivitidis, Haemophilus influenzae, Brucella abortus, Escherichia coli, Eberthella typhosa, Streptococcus haemolyticus, Streptococcus viridans and Diplococcus pneumoniae (type 1 and type 3) usually resist in vitro temperatures of 107 F. for a period of twenty-four hours; an occasional strain shows some reduction in numbers.[68]

Effects on Circulatory System.—The pulse rate and circulatory rate are increased.[69] The minute volume output of the heart is increased and the velocity of the blood may be increased as much as 400 per cent.[70] There is an initial increase followed by a decrease in the blood pressure and a decrease in pulse pressure.[12] There is a marked increase in the pulse volume changes of the fingers in all types of artificial fever, with the exception of fevers caused by foreign protein. It has been suggested that the vasodilatation which occurs during fever produced by foreign protein is possibly of central origin, while the vasodilatation which occurs in artificial fever induced by external heat with a consequent prevention of heat loss is chiefly of peripheral origin. The maximum increase of circulation in artificial fever occurred in general at temperatures between 103 and 104 F.[4] Alterations in the electrocardiogram are not uniform. While the amplitude of the contractions is decreased, it cannot be inferred that fever therapy has any harmful effect on the heart.[71] There is no change in the volume, or only a slight concentration of the blood, and no change occurs in the viscosity of the blood when the intake of fluids is encouraged.[72] The visible capillaries of the nail beds are increased in number and size. The erythrocyte count generally is not changed.[72] An initial decrease and a subsequent increase occur in the number of

66. Boak, Ruth A.; Carpenter, C. M., and Warren, S. L.: The Thermal Death Time of 130 Strains of Neisseria Gonorrhoeae, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, p. 5.

67. Duncan, G. R., and Mariette, E. S.: Report on Artificial Hyperpyrexia in Tuberculosis as Carried Out at Glen Lake Sanatorium, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 1-2.

68. Thompson, Luther; Sheard, Charles, and Larson, Nora: The Effect of Heat at 107 F. (41.8 C.) on Various Bacteria, Proc. Staff Meet., Mayo Clin. **11:** 319 (May 13) 1936.

69. Phillips, Kenneth, and Shikany, S.: The Value of Hyperpyrexia in the Treatment of Bronchial Asthma, South. M. J. **28:** 801-814 (Sept.) 1935.

70. Simpson, W. M.: Artificial Fever Therapy of Syphilis, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 110-114.

71. Bierman, William, and Vesell, Harry: The Electrocardiogram in Fever, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 32-33.

72. Hench, P. S.; Slocumb, C. H., and Popp, W. C.: Fever Therapy: Results for Gonorrheal Arthritis, Chronic Infectious (Atrophic) Arthritis and Other Forms of "Rheumatism," J. A. M. A. **104:** 1779-1790 (May 18) 1935.

leukocytes.[72] There is a relative and an absolute decrease in the number of lymphocytes.[73] The hematopoietic response is characterized by consistent leukocytosis, with delivery of polymorphonuclear neutrophils of increasing immaturity. Destruction of lymphocytes occurs and there is probably some destruction or redistribution of monocytes. A shift of the neutrophilic granulocytes to the left and the presence of clasmatocytes in the peripheral blood (which are outstanding in malaria) are not seen in cases in which fever is produced by physical means.[74]

There is no change in the nitrogenous constituents (urea, uric acid, creatinine) or there may be slight increase (if there is an increase in the concentration of the blood).[72] There is nearly consistent increase in the creatinine clearance, in contrast to wide variations which occur in infections.[75] There is no change in the nonnitrogenous constituents (sugar, phosphorus, lipids, calcium) or only a slight increase (if there is an increase in the concentration of the blood).[72] No significant decrease occurs in the lipids of the plasma, such as is seen in acute infections.[76] There probably is an alteration in the acid-base balance of blood in the direction of slight alkalosis.[77] Marked alkalosis may be noted.[78] Opinions vary as to the effect on the chlorides; some writers say that there may be marked decrease,[79] while others say that there is no significant change.[69] If salt or weak saline solution is administered by mouth during treatment, the blood chlorides drop very little. If no sodium chloride is administered and sweating is profuse, a drop in the blood chlorides is to be expected. The oxygen content and oxygen combining power of venous blood are increased.[72] Opinions also vary as to the effect on the agglutinins, but the agglutination titer generally is within normal limits.[80] The complement fixing antibodies are temporarily diminished, but there is no change in the opsonic index.[81]

Other Effects.—Examination of the gastric contents reveals a sudden decrease in the amount of chlorides and an increase in the amount of lactic acid.[72] The urine is increased in amount, but temporary oliguria generally occurs.[82] The reaction of the urine is unchanged, or the urine is slightly alkaline and its specific gravity is increased.[83] The basal metabolic rate is increased approximately 7 per cent for each degree of fever induced.[72] Cold fluids, taken by mouth, produce fluctuations in the gastric temperature but do not appreciably affect the general temperature.[84] Comparison of temperatures in the median antibrachial vein, rectum, uterine cervix, Hunter's canal, bladder and spinal canal indicate that records of the rectal temperature provide an accurate index of the temperature of the deep tissues.[84] After each individual treatment there may be a temporary loss of weight due to loss of fluid (unless sufficient fluids are taken by mouth). However, this loss is quickly regained and, after a course of fever therapy, a patient usually retains his original weight or even gains weight.

PATHOLOGIC CHANGES

Hemorrhagic encephalitis has occurred in some instances, and hemorrhagic pneumonia also has been noted. Deterioration and hemorrhage may occur in the cortex of the adrenal glands. Death may occur as the result of vascular collapse. Since both fever therapy and sodium amytal (which is frequently used as a sedative in fever therapy) tend to produce marked dilatation and engorgement of the blood vessels, it is suggested that the combination should not be used.[85] In tuberculous animals, marked hemorrhages may occur in tuberculous lesions. Tuberculous lesions are more extensive among animals that have been treated with induced fever than they are among animals that have been used as controls.[67] In subacute bacterial endocarditis there is apparently danger that fever therapy may produce multiple emboli.[49]

TECHNIC

Studies during the past year have emphasized the facts previously stressed by the Council on Physical Therapy, namely, that production of fever by physical means is strictly a hospital procedure; that it is essential that a well trained personnel be in complete charge of the work; that skilful nurse technicians, who have had at least one month's supervised training, administer the treatments, and that a physician be in constant attendance. Patients to be treated with fever should be selected with as much care as are patients who are to undergo a major surgical operation.

The dangers that have been mentioned—of emboli, hemorrhages and sudden death—are extremely rare when the administration of the fever treatments is in the hands of a competent, well organized group. However, there is certain to be a very slight mortality with a treatment as heroic as this. If these treatments are given without proper control or are considered as simple office procedures, there is danger of harm to the patient or even death.

Opinions vary as to the best and safest physical means of producing fever. Almost any one of the methods described in this article may be used with the confidence that it will produce favorable results provided the team of workers who are using it have developed a good technic for the particular method.

It would seem quite apparent that, for the present, the medical profession as a whole should avoid the use of fever therapy unless there is available an institution properly equipped to administer this type of treatment.

The controversy still goes on concerning the effectiveness of fever produced by physical means as compared to fever produced by malarial inoculations or by injections of foreign protein. It is not the purpose of this article to enter into this controversial phase of the subject. It would seem from a clinical standpoint that the production of artificial fever by physical means offers certain factors of control and safety which make it appear preferable in some instances to the production

73. Krusen.[45] Hargraves and Doan.[74]

74. Hargraves, M. M., and Doan, C. A.: The Physiologic Response of the Hemopoietic Tissues to Artificially Induced Fever, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 51-58.

75. Grant, W. H., and Medes, Grace: Creatinine Clearance During Hyperthermia of Diathermy and Fevers, J. Lab. & Clin. Med. **20**: 345-349 (Jan.) 1935.

76. Stoessor, A. V., and McQuarrie, Irvine: Influence of Acute Infection and Artificial Fever on Plasma Lipids, Am. J. Dis. Child. **49**: 658-671 (March) 1935.

77. Danielson, W. H., and Stecher, R. M.: Acid-Base Balance of Blood in Hyperthermia, Proc. Soc. Exper. Biol. & Med. **32**: 1015-1016 (April) 1935.

78. Lepore, M. J.: Chloride and Water Metabolism in Patients with Artificial Fever, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 38-39.

79. Desjardins and Popp.[12]

80. Jung, Ruth W.: Immunologic Studies in Hyperpyrexia, Arch. Physical Therapy **16**: 397-404 (July) 1935.

81. Hadjopoulos, L. G., and Bierman, William: Effects of Hyperpyrexia Induced by Physical Means upon Complement-Fixing Antibodies, J. Lab. & Clin. Med. **20**: 227-230 (Dec.) 1934.

82. Phillips and Shikany.[60] Hench, Slocumb and Popp.[23]

83. Phillips and Shikany.[60] Egan and Piaskoski.[26]

84. Sittler, E. C.: The Kettering Hypertherm, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 115-117.

85. Hartman, F. W., and Major, R. C.: Pathological Changes Resulting from Accurately Controlled Artificial Fever, Am. J. Clin. Path. **5**: 392-410 (Sept.) 1935.

of fever by malarial inoculations or by injections of foreign protein. Likewise, clinical observations would indicate that in the treatment of disease by these two methods the results obtained are somewhat comparable.

COLLINS VASCULATOR ACCEPTABLE

Manufacturer: Warren E. Collins, Inc., Boston.

The Collins Vasculator, according to the manufacturer, provides a convenient means of applying alternate suction and pressure in the treatment of peripheral vascular disease. The essential parts of this device are the pump, the motor, and the boot or chamber.

A rotary pump supplies both positive and negative pressures and is driven by a V-belt connected to a one-quarter horse power electric motor, which is supplied for either alternating or direct current. A valve, operated by a cam, alternatively connects the suction and pressure outlets of the pump to an air duct leading to outlets at the rear of the cabinet. The cam which establishes the timing of the pressure changes is driven by a reduction gear connected to the pump shaft by a V-belt, and makes one revolution in approximately thirty seconds. The cam operates a lever, which causes the valve to connect the air duct to the suction side of the pump for approximately twenty-five seconds and to the pressure side for five seconds. Other combinations are available.

Connected to the air duct is the pressure indicating gage, which is mounted on the front of the cabinet. The gage is calibrated in millimeters of mercury and indicates accurately both suction and pressure.

Also connected to the duct are two control valves, one of which regulates the pressure, the other the suction. Each valve is provided with spring tension, varied by a screw to which the control knob is attached. A stop on the adjusting screw limits the amount of tension applied to the spring and, accordingly, the maximum amount of suction or pressure in the air duct, outlet manifold, and treatment chamber. These valves therefore perform the function of conventional "safety valves," as well as regulating the pressures.

The mechanism is assembled on a steel chassis, which is mounted in the cabinet on rubber mountings, to minimize the transmission of vibration and mechanical noise. The Vasculator cabinet is made of steel, with hinged cover which affords access to the control valves and also the mechanism. The cabinet is 30 inches high, 26 inches wide and 15 inches deep, and is mounted on rubber-tired ball-bearing casters. The interior is lined with sound-absorbing material.

The treatment chamber or boot is constructed of steel and is approximately 30 inches long, 14 inches high and 12 inches wide. The upper half is provided with a window of heavy-gage cellulose acetate. At one end is an opening through which the leg or arm to be treated is inserted. The opening is rendered air tight during treatment by means of rubber cuffs mounted on aluminum rings, which are clamped to the end of the boot. The cuffs are supplied in a total of eight graduated sizes, ranging from 3½ inches to 7 inches in diameter. The mounting ring for each cuff is marked with the circumference of the cuff, enabling fitting by measuring the arm or leg with a tape measure at the point where the cuff is to be applied.

Collins Vasculator.

The Vasculator is provided with outlets for the operation of two boots. These are connected to the apparatus by rubber hose, tapered outlets being provided for its attachment.

The motor requires an electrical input of between 300 and 400 watts, depending on the load, which varies somewhat with the individual pressure variations as well as with the pressure adjustment.

Some indications for the use of this type of apparatus appear to be acute vascular occlusion, freezing, and vascular diseases with major involvement of the large vessels. Contraindications appear to be thrombophlebitis, cellulitis or lymphangitis (acute or subacute); extensive destruction of the arteriolar or capillary vessels; advanced thrombo-angiitis obliterans with capillary stasis and advanced arteriosclerosis with capillary stasis, and venous thrombosis.

This apparatus has a very limited field of usefulness and probably therefore does not belong in the armamentarium of the average physician. It belongs rather in the realm of hospital equipment, since most of these rare arterial diseases are hospital cases.

In view of the satisfactory performance of this unit with reference to the treatment of acute vascular occlusion, freezing and vascular diseases with major involvement of the large vessels, the Council on Physical Therapy voted to include the Collins Vasculator in its list of accepted apparatus.

Council on Pharmacy and Chemistry

REPORTS OF THE COUNCIL

Nomenclature of Endocrine Principles: III.

THE PRESENT UNSETTLED STATE OF ENDOCRINOLOGIC NOMENCLATURE HAS BEEN THE CAUSE OF INCREASING CONFUSION IN RECENT YEARS. IN AN EFFORT TO REMEDY THIS DEPLORABLE SITUATION, THE COUNCIL SOLICITED THE COOPERATION OF A NUMBER OF EXPERTS WHO HAVE MADE FUNDAMENTAL CONTRIBUTIONS TO GLANDULAR PHYSIOLOGY. THIS GROUP, TERMED THE ADVISORY COMMITTEE ON THE NOMENCLATURE OF ENDOCRINE PRINCIPLES, IS COMPOSED OF THE FOLLOWING: DRS. EDGAR ALLEN, WILLARD M. ALLEN, J. B. COLLIP, G. W. CORNER, E. A. DOISY, E. T. ENGLE, H. M. EVANS, R. T. FRANK, F. L. HISAW, F. C. KOCH, LEO LOEB, G. F. MARRIAN, C. R. MOORE, OSCAR RIDDLE, P. E. SMITH AND C. W. TURNER; M. S. BISKIND, CORRESPONDING SECRETARY. ON THE RECOMMENDATION OF THIS COMMITTEE, THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT, WHICH IS THE THIRD OF A SERIES. THE PRECEDING REPORTS APPEARED IN THE JOURNAL MAY 23, 1936, PAGE 1808, AND JULY 18, 1936, PAGE 210. IT IS ANTICIPATED THAT ANOTHER REPORT ON A RELATED TOPIC WILL BE PUBLISHED IN THE NEAR FUTURE.

THE COUNCIL DESIRES TO EXPRESS ITS SINCERE APPRECIATION TO THE MEMBERS OF THE ADVISORY COMMITTEE FOR THEIR WILLING COOPERATION.

PAUL NICHOLAS LEECH, Secretary.

THE NOMENCLATURE OF ESTRUS-PRODUCING COMPOUNDS

Crude extracts of ovary and placenta which produced uterine growth were obtained by Adler[1] (1912), Iscovesco[2] (1912), Fellner[3] (1912), Herrmann[4] 1915) and others. Using a similar biologic reaction, Robert Frank[5] (1922) made the significant discovery that liquor folliculi also contains an active substance. However, the chemical work leading to purification and isolation did not progress rapidly, owing primarily to the difficulties of assay; but with the introduction of Allen's rapid vaginal smear method (Allen and Doisy,[6] 1923) based on the phenomenon described by Stockard and Papanicolaou, investigation of the follicular hormone became very active. Among the subsequent contributions leading to the isolation of pure crystalline estrogenic compounds, the discovery of Aschheim and Zondek[7] (1927) of the estrus-producing property of the urine of pregnant women was, perhaps, the most important.

The first crystalline estrogenic compound was isolated by Doisy, Veler and Thayer[8] in 1929; shortly after this discovery was announced, Butenandt[9] (1929) reported the isolation of

1. Adler, L.: Zur Physiologie und Pathologie der Ovarialfunktion, Arch. f. Gynäk. **95**: 349, 1912.
2. Iscovesco, H.: Les lipoïdes de l'ovaire, Compt. rend. Soc. de biol. **73**: 16, 1912; Les lipoïde utero-stimulant de l'ovaire, ibid. **73**: 104, 1912.
3. Fellner, O. O.: Experimentelle erzeugte Wachstumveränderungen am weiblichen Genitale der Kaninchen, Centralbl. f. allg. Path. u. path. Anat. **23**: 673, 1912.
4. Herrmann, E.: Ueber eine wirksame Substanz im Eierstocke und in der Placenta, Monatschr. f. Geburtsh. u. Gynäk. **41**: 1, 1915.
5. Frank, R. T.: The Ovary and the Endocrinologist, J. A. M. A. **78**: 181 (Jan. 21) 1922.
6. Allen, Edgar, and Doisy, E. A.: An Ovarian Hormone: Preliminary Report on Its Localization, Extraction and Partial Purification and Action in Test Animals, J. A. M. A. **81**: 819 (Sept. 8) 1923. Allen, Edgar; Doisy, E. A.; Francis, B. F.; Robertson, L. L.; Colgate, C. E.; Johnston, C. G.; Kountz, W. B., and Gibson, H. V.: The Hormone of the Ovarian Follicle: Its Localization and Action in Test Animals, and Additional Points Bearing upon the Internal Secretion of the Ovary, Am. J. Anat. **34**: 133 (Sept.) 1924.
7. Aschheim, Selmar, and Zondek, Bernhard: Hypophysenvorderlappen Hormon und Ovarialhormon im Harn von Schwangeren, Klin. Wchnschr. **6**: 1322 (July 9) 1927.
8. Doisy, E. A.; Veler, C. D., and Thayer, S. A.: Folliculin from Urine of Pregnant Women, Am. J. Physiol. **90**: 329 (Oct.) 1929.
9. Butenandt, Adolf: Ueber "Progynon," ein krystallisiertes weibliches Sexualhormon, Naturwissenschaften **17**: 878, 1929.

the same compound. In the following year Marrian[10] (1930) obtained a different estrogenic compound in the crystalline condition; shortly thereafter, Doisy and his co-workers[11] (1930) reported the isolation of the same compound. In 1932 Girard and his collaborators[12] reported the isolation of three additional crystalline compounds, and Butenandt and Störmer,[13] and Schwenk and Hildebrandt[14] claimed the isolation of two isomers of the compound originally isolated by Doisy. Using tissues instead of pregnancy urine, Browne and Collip[15] (1931) isolated the compound originally obtained by Marrian. In 1935 MacCorquodale, Thayer and Doisy[16] reported the separation of still another pure estrogenic substance from hog ovaries, and Wintersteiner, Schwenk and Whitman[17] obtained the same compound and one of its isomers from the urine of pregnant mares. Thus there are at least seven naturally occurring estrogenic substances that have been isolated in a crystalline condition. As the result of investigations by Butenandt, Cook, Doisy, Marrian and their respective associates the structure of these and related compounds has been definitely established.

In their earlier work Allen and Doisy called the active substance of liquor folliculi the ovarian hormone, but with the proof of the existence of another ovarian hormone (Hisaw,[18] 1928; Corner,[19] 1929) they changed their designation to ovarian follicular hormone.[20] In spite of their realization that this term was cumbersome, they expressed the view that investigators should await the actual isolation of the hormone before applying a name. However, others, chiefly pharmaceutical houses, did not hesitate to apply names. As a few examples, some English investigators called the follicular hormone oestrin; Parke, Davis and Company named its commercial product estrogen; Laqueur called his extract menformon; Loewe, thelykinine, and Zondek, folliculin. The term oestrin[20a] came into rather widespread usage particularly in England.

With the isolation of the first crystalline estrogenic substance, Doisy sought advice from the Council on Pharmacy and Chemistry on a name for the new compound. It was obvious that the name to be selected should avoid confusion with existing commercial names and also with names for impure extracts. The name selected was theelin (Veler, Thayer and Doisy,[21] 1930). Since there was no established international agency for nomenclature, this term was submitted to the Council on Pharmacy and Chemistry, which approved it as the common name on the condition that it be neither patented, copyrighted nor trademarked. This condition was met and according to Doisy has been adhered to.[22]

However, the term theelin has not been widely accepted. Marrian retained the name oestrin and on recognition of several oestrins used distinctive modifications of the original term; Butenandt has used the terms progynon or follikelhormon; Laqueur, menformon (cryst.), and Browne and Collip, emmenin, for their crystalline compounds. Perhaps the reasons why the name theelin did not gain universal recognition were that (1) Parke, Davis and Company was allowed to market its preparation of the crystalline substance under the name theelin; (2) the suffix "-in" is not indicative of the chemical nature of the compound; (3) no system of nomenclature for compounds of this series has been proposed.

Two systems of nomenclature have been proposed; one by Girard[23] using the root "folli-" with suffixes to indicate the nature of the compounds; the other by a group of English investigators (Adam and collaborators[24]) using the root "oestr-" with certain modifications. It is not known whether, in either case, other investigators were consulted.

In view of the importance of Edgar Allen's investigations in opening up the field of the follicular hormone and of Doisy's contributions in isolating the first crystalline estrus-producing compound and the further fact that the Council has approved theelin as a common name, the Advisory Committee considered a proposal (1) to retain "theel-"[25] as the root for the names of the estrus-producing compounds; (2) to adopt a system of suffixes in accordance with recognized principles of nomenclature which would provide satisfactory common names for the entire group of known compounds and of compounds which may be isolated in the future; (3) to modify the designation of the substance now known as theelin in order to remove the objections resulting from its trade usage.

However, in view of the fact that the system of nomenclature devised by Adam and his collaborators[24] has been fairly widely adopted among investigators, it appeared inadvisable to supplant this system even though the new system based on "theel-" was simpler and more nearly in accord with the nomenclature for the androgens. But, as "theelin" was the name applied by the discoverers of the first crystalline estrogenic compound and

10. Marrian, G. F.: Observations on the Chemical Nature of Crystalline Oestrin, J. Soc. Chem. & Ind. **49**: 515, 1930; The Chemistry of Oestrin: III. An Improved Method of Preparation and the Isolation of Active Crystalline Material, Biochem. J. **24**: 435, 1930; The Chemistry of Oestrin: IV. The Nature of Crystalline Preparations, ibid. **24**: 1021, 1930.

11. Doisy, E. A.; Thayer, S. A.; Levin, L., and Curtis, J. M.: A New Triatomic Alcohol from the Urine of Pregnant Women, Proc. Soc. Exper. Biol. & Med. **28**: 88 (Oct.) 1930.

12. Girard, André; Sandulesco, G.; Fridenson, A., and Rutgers, J. J.: Sur une nouvelle hormone sexuelle cristallisée retirée de l'urine des juments gravides, Compt. rend. Acad. d. sc. **194**: 909 (March 7) 1932; Sur une nouvelle hormone sexuelle cristallisée, ibid. **195**: 981 (Nov. 21) 1932; Sur les hormones sexuelles cristallisées retirées de l'urine des juments gravides, ibid. **194**: 1020 (March 14) 1932.

13. Butenandt, Adolf, and Störmer, I.: Ueber isomere Follikelhormone; Untersuchungen über das weibliche Sexualhormon, Ztschr. f. physiol. Chem. **208**: 129, 1932.

14. Schwenk, Erwin, and Hildebrandt, F.: Naturwissenschaften **20**: 658, 1932.

15. Collip, J. B.: Proc. California Acad. Med. **28**, 1931.

16. MacCorquodale, D. W.; Thayer, S. A., and Doisy, E. A.: The Ovarian Follicular Hormone, Proc. Soc. Biol. Chem., April 10-13, 1935; The Crystalline Ovarian Follicular Hormone, Proc. Soc. Exper. Biol. & Med. **32**: 1182 (April) 1935.

17. Wintersteiner, Oskar; Schwenk, Erwin, and Whitman, Bradley: Estrogenic Dihydroxy Compounds in the Urine of Pregnant Mares, Proc. Soc. Exper. Biol. & Med. **32**: 1087 (April) 1935.

18. Hisaw, F. L.; Meyer, R. K., and Weichert, C. K.: Inhibition of Ovulation and Associated Histological Changes, Proc. Soc. Exper. Biol. & Med. **25**: 754 (June) 1928.

19. Corner, G. W., and Allen, W. M.: Physiology of the Corpus Luteum: II. Production of a Special Uterine Reaction (Progestational Proliferation) by Extracts of the Corpus Luteum, Am. J. Physiol. **88**: 326 (March) 1929.

20. In the historical development of our knowledge of the regulation of the sexual cycle, the following periods may be distinguished: 1. Not only did Fränkel attribute to the corpus luteum the function of making possible and maintaining pregnancy, but he considered this organ also as the sole active agent in the ovary. 2. The experiments of Leo Loeb defined the principal functions of the corpus luteum; these made it evident that other factors entered into the domination of the cyclic functions besides the corpus luteum. All the available evidence pointed to the large and mature follicles as the additional factors. These investigations led to the development by Loeb of the concept that a follicular phase and luteal phase have to be distinguished in the sexual cycle. 3. The experiments of Frank and especially of Edgar Allen and Doisy very clearly proved the existence of the follicular hormone. This led to the isolation of pure estrogenic compounds by Doisy and by Butenandt. 4. The confirmatory evidence in favor of the existence of the two phases mentioned was given especially by Courrier and Parkes. 5. The work of Corner and Allen as well as of Hisaw initiated the investigations which led to the purification of the corpus luteum hormone. The significance of the corpus luteum in regulation of the growth of the mammary gland was proved by Ancel and Bouin and by Turner.

20a. The use of the term "(o)estrin" as a generic name has caused much confusion (see Glandular Physiology and Therapy, Chicago, American Medical Association, 1935, page 477). The almost identical designation "esterin" is a registered trade mark under which Frederick Stearns and Company markets a mixture of acetylsalicylic acid, acetophenetidin and caffeine.

21. Veler, C. D.; Thayer, S. A., and Doisy, E. A.: The Preparation of the Crystalline Follicular Ovarian Hormone: Theelin, J. Biol. Chem. **87**: 357 (June) 1930.

22. In New and Nonofficial Remedies 1936, page 323, the following statement occurs: "The Council has recognized the nonproprietary name Theelin for the crystalline (ketohydroxy) estrogenic hormone as described by Doisy and the nonproprietary name Theelol for the crystalline (trihydroxy) estrogenic hormone as described by Doisy." The adoption of these names as nonproprietary designations was based on an agreement with E. A. Doisy that "the name [theelin] will not be copyrighted or used as a trademark." Furthermore, the contract of St. Louis University with its licensee, Parke, Davis & Co., requires that the name must be submitted for aproval to the Council. In presenting theelin to the Council in 1931, Parke, Davis & Co. specifically stated that theelin was not a trade mark and had not been registered in foreign countries. Neither "theelin" nor "theelol" appears in the list of names registered with the Pharmaceutical Trade Mark Bureau (1934); this list contains both names that are registered trade marks and others which are not registered in the patent office.

"Theelin" and "theelol" do appear in appendix XIV of the British Pharmaceutical Codex 1934, entitled "Substances with Proprietary Trade-Names." This has been cited as evidence that these names are in fact proprietary. However, in the introduction to this appendix it is stated ". . . it is important to note that the majority of names included in the list are registered trade-marks . . ." No distinction is made in this list between trade marks and unprotected names; it is obvious that many of the designations belong in the latter category and that the term "proprietary" is very loosely employed in the Codex. In another semi-official British publication, "The Extra Pharmacopœia" of Martindale and Westcott, "theelin" is indicated as a nonproprietary designation.

"Theelin" and "theelol" appear in fact therefore to be nonproprietary names.

23. Girard, André: La chimie des hormones sexuelle, Bull. Soc. chim. biol. **15**: 562 (May) 1933.

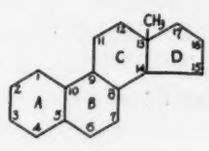
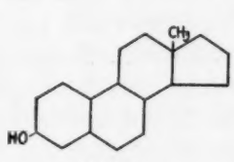
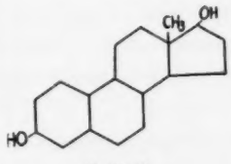
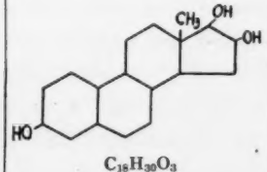
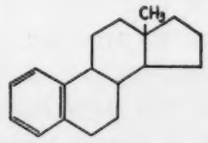
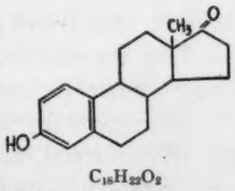
24. Adam, N. K.; Danielli, J. F.; Dodds, E. C.; King, H.; Marrian, G. F.; Parkes, A. D., and Rosenheim, O.: Nomenclature of the Oestrin Group, Nature **132**: 205 (Aug. 5) 1933.

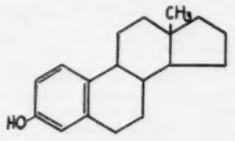
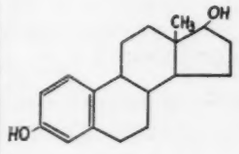
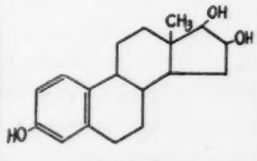
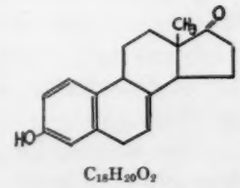
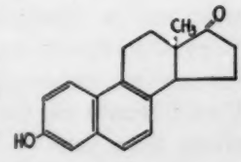
25. "Theel-": Etymology, "Theely-," a Greek root which, in combination, always indicates femaleness.

as this name and "theelol" stand accepted by the Council as nonproprietary names, the Advisory Committee voted that these terms and "dihydrotheelin" should be retained as synonyms.

Accordingly, the Council, on the recommendation of the Advisory Committee, decided (1) to adopt the system of nomenclature based on the root *estr-;* (2) to retain *theelin, theelol* and *dihydrotheelin* as synonyms for the compounds known in the aforementioned system as *estrone,*[26] *estriol*[27] and *estradiol* respectively; and (3) to adopt the term *estrogenic* to describe those compounds or extracts which in addition to their other physiologic properties produce estrus, and to adopt the noun *estrogen*[28] as the collective term for all the substances having these properties. The structure, empirical formulas and the common and chemical names of the estrogens are given in the accompanying table.

Terminology for Estrogens

Common Name	Structure	Chemical Name
Estrane	 $C_{18}H_{30}$	Estrane
Estranol	 $C_{18}H_{30}O$	3-hydroxy estrane
Estranediol	 $C_{18}H_{30}O_2$	3, 17-dihydroxy estrane
Estranetriol	 $C_{18}H_{30}O_3$	3, 16, 17-trihydroxy estrane
Estratriene	 $C_{18}H_{24}$	$\Delta^{1,3,5}$—Estratriene
Estrone or *Theelin*	 $C_{18}H_{22}O_2$	3-hydroxy 17-keto $\Delta^{1,3,5}$—estratriene

Common Name	Structure	Chemical Name
Estrenol	 $C_{18}H_{24}O$	3-hydroxy $\Delta^{1,3,5}$—estratriene
Estradiol or *Dihydrotheelin*	 $C_{18}H_{24}O_2$	3, 17-dihydroxy $\Delta^{1,3,5}$—estratriene
Estriol or *Theelol*	 $C_{18}H_{24}O_3$	3, 16, 17-trihydroxy $\Delta^{1,3,5}$—estratriene
Equilin	 $C_{18}H_{20}O_2$	3-hydroxy 17-keto $\Delta^{1,3,5,7}$—estratetraene
Equilenin	 $C_{18}H_{18}O_2$	3-hydroxy 17-keto $\Delta^{1,3,5,6,8}$—estrapentaene

26. The term "estrone" had been registered by Parke, Davis and Company with the Pharmaceutical Trade Mark Bureau[22] but, according to the firm, it was not registered in the U. S. Patent Office. On the request of the Secretary of the Council, Parke, Davis and Company has agreed to relinquish any proprietary rights that it may have in this name.

27. The name "esterol" (which might readily be confused with "estriol") is a registered trade mark which is owned by Frederick Stearns and Company and under which it has marketed its preparation of benzyl succinate. This firm, in response to a request by the Secretary of the Council has commendably agreed to relinquish proprietary rights in the trade mark "esterol" in order to avert possible confusion. The Council desires to express its appreciation to Frederick Stearns and Company for its cooperation in this matter.

28. "Estrogen" is a registered trade mark belonging to Parke, Davis and Company. On the request of the Secretary of the Council this firm has commendably agreed to relinquish its proprietary rights in the name on its adoption by the Council as a generic term. The Council desires to express its appreciation to Parke, Davis and Company for its action in this matter as well as in the case of the name "estrone."[26]

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SATURDAY, OCTOBER 10, 1936

CHILD MORTALITY FROM AUTOMOBILE ACCIDENTS

In every section of the country, concentrated efforts by towns and cities have developed toward diminishing the number of automobile accidents and fatalities. The statistics that have been compiled give evidence of the appalling automobile mortality each year. There is little reason to believe that these figures will diminish in magnitude in the near future. Rigorous measures are required to remedy the condition and to limit the number of accidents. Direct emphasis of the importance of necessary restrictions can best be obtained by a program of public education, based on a compilation and analysis of detailed statistics bearing on the subject. The material dealing with automobile fatalities usually refers only to the total number of lives lost during some definite time in the entire country or in some selected area and only occasionally deals with the loss of life suffered in broad age groups. Careful treatment of mortality figures in various age groups in different geographic regions are of considerable value in bringing proper stress on the seriousness of the situation and in serving as excellent support for proposed programs of reform designed to remedy the condition. This is particularly true for statistics dealing with mortality among children, because of the more marked sentimental appeal that can be made on this basis. Adequate surveys of child mortality from automobile accidents are therefore of particular significance and the United States Public Health Service is rendering valuable aid in supplying these data.

The first two reports in a series of studies on the fatal accidents of childhood have just been compiled by W. M. Gafafer,[1] senior statistician of the United States Public Health Service. The first report considers child mortality in different geographic regions of the United States and deals with single years of age under 5 and for the age groups 5 through 9 and 10 through 14 years. In this report the period is limited to 1930 principally because it is the most recent year for which accurate population enumerations exist. The second report presents a study of certain time changes in the distribution of mortality from automobile accidents among children in the United States. The period in this publication extends from 1925 through 1932. For purposes of comparison of automobile fatalities with other causes of death, statistics are included for mortality from other accidents, and for further comparative purposes the mortality is included from three common communicable diseases; namely, measles, scarlet fever and diphtheria. Analysis of these comparative data reveals that under 15 years of age there were more than two deaths from accidents to one death from the three diseases; only for infants of 1 year is the ratio less than 1. Mortality from automobile accidents seems to vary in importance with age. Considering all total accidents, mechanical suffocation leads at under 1 year of age, burns at 1 and 2 years, automobile accidents and burns at 3, and automobile accidents at 4, 5 to 9, and 10 to 14 years of age. Of forty-seven states and the District of Columbia, divided into four broad geographic groups, the Northeastern section of the country leads in deaths of children from automobile accidents; this is undoubtedly related to the comparatively large number of automobile registrations in this area.

These illuminating statistics present interesting relationships between the number of fatalities from automobile accidents and those from accidents of all types and strikingly emphasize the overwhelmingly high mortality of children from automobile accidents. Such a survey should serve as a concrete basis not only for drastic and sane restrictions on the operators of motor vehicles but also for emphasizing to the pedestrian the potential danger of the automobile.

1. Gafafer, W. M.: Pub. Health Rep. **51**: 1083 (Aug. 7), 1186 (Aug. 28) 1936.

THE SEX RATIO AT BIRTH

Various theories have been offered in explanation of the well known fact that the number of male births always exceeds that of female births. Although the biologic processes that ultimately determine the preponderance of males as compared with females at birth are, according to Russell,[1] imperfectly understood as yet, it is possible to study the relation to such purely external factors as age, nationality and social status of the parents, and to primogeniture and size of the family, seasonal and secular trend, and the extent to which it is influenced by cross-breeding, migration and social upheavals. Such was the purpose of the study recently reported by Russell.

The statistics on which the investigations were based were obtained from (1) the Annual Reports of the Registrar-General for England and Wales, (2) the Reports on Births and Still Births in the United States, (3) Annuaire international de statistique, and (4) the

1. Russell, W. T.: Statistical Study of the Sex Ratio at Birth, J. Hyg. **36**: 381 (July) 1936.

records of families given in Burke's Peerage for the seventeenth, eighteenth and nineteenth centuries. In England and Wales the proportion of males per thousand females during the past ninety-five years ranges from 1,032 to 1,061, the latter value occurring immediately after the war. The mean ratio over the whole period was 1,043, and the average dispersion or scatter as represented by the standard deviation was 5.7. For London the experience over a longer series of years (292, from 1629 to 1920) could be obtained from the study of christenings. Since there is no evidence of the selection of christening of boys as compared with girls, the resultant figures cannot be considered inaccurate per se. The values obtained correspond closely with those for England and Wales for a shorter period.

The association between the degree of urbanization and the size of the sex ratio has concerned some writers on the subject. The evidence obtained from English data with regard to the higher proportion of masculinity in the rural areas as compared with urbanized centers is supported by the available statistics in the United States. The latter showed that the sex ratios in the urban and rural areas during the period 1927-1929 were 1,057 ± 1.20 and 1,064 ± 1.15 respectively. The difference of 7 ± 1.66 in favor of the rural areas is thus greater than would be expected to arise by mere chance. A possible explanation of the higher ratios of live births in rural areas as compared with urban centers is a probable lower incidence of abortions in the former, superadded to the undoubted fact that the proportion of still births to total live births is lower in the country than in the town. Some investigators have stressed the fact that the sex ratio of illegitimate births is smaller than that of live births. The English statistics, however, reveal an index for illegitimate births almost identical with that for legitimate ones.

A study of the seasonal variation of the index in England and Wales supports the general belief in the absence of any seasonal correlation. However, the statistics for the urban and rural divisions of the United States for the period 1921-1924 and for New York City for 1929-1933 reveal evidence of a definite trend. In each area the sex ratio is lowest in the first quarter, attains its maximum in the second, and then gradually declines; hence the American statistics, contrary to the experience in England, support the view that conception occurring from July to September is favorable to increased masculinity.

In some countries, particularly Greece, the masculinity of births is exceptionally high; in others, Japan and Italy, low; and there is evidence that the ratio may be influenced through such a factor as migration. Births resulting from marriages of the same nationalities in foreign lands result in a lower sex ratio than those occurring in the home land. There is no satisfactory evidence obtainable that marriage of different nationals, or what may be termed crossbreeding, influences the index. Social upheavals do influence the index. In countries that were affected by the World War, the sex ratio was high. It was higher after the termination than during the war. Neutral countries experienced the same phenomenon but not to such an appreciable degree. The ratio is higher among first born children and declines with increased family size. In England and Wales the masculinity ratio is definitely correlated with social status; i. e., the index decreases in size with descent in the social scale. The causes for this are not clear.

Russell was able to find no conclusive evidence that the sex ratio is related to the age of the parents, but any relationship that may exist is with the age of the father rather than with the age of the mother. The biologic fact of the preponderance of male births in the human race is an established one, but its purpose is still a matter of debate.

The observations brought out by the studies of Russell and others furnish material of wide interest to all those interested in biologic processes. A further analysis of the factors that may be involved would doubtless prove of additional significance. The sex ratio in other species of animals might serve as the essential clue in determining the ultimate objectives of nature in producing this inequality.

VITAMIN C AND TUBERCULOSIS

Investigations during the past few years have indicated that vitamin C plays an important part in determining the resistance of the animal organism to certain types of bacterial infections and toxins. For example, guinea-pigs fed a ration deficient in the vitamin are much less resistant to diphtheria toxin than are normal control animals; similarly, the administration of vitamin C (cevitamic acid) to normal guinea-pigs increases their resistance to the toxin.[1] A protective effect of vitamin C against tuberculous infections in animals has likewise been described repeatedly. Decreased resistance to tuberculous infection develops in animals fed a vitamin C deficient diet and, conversely, an increased susceptibility to acute scurvy is seen in infected animals.

The comparatively recent introduction of methods for the determination of vitamin C and for following the intake and excretion of the vitamin has made possible studies on the metabolism of this substance in human subjects. As a result, the amounts of vitamin C ingested daily in the ordinary mixed diet and excreted daily in the urine of normal human subjects are known with some degree of certainty. More recently, studies of this type have been made on patients with various diseases; the results in tuberculous patients have been

1. Greenwald, C. K., and Harde, E.: Vitamin C and Diphtheria Toxin, Proc. Soc. Exper. Biol. & Med. **32**: 1157 (April) 1935. King, C. G., and Menten, M. L.: The Influence of Vitamin C Level upon Resistance to Diphtheria Toxin: I. Changes in Body Weight and Duration of Life, J. Nutrition **10**: 129 (Aug.) 1935. Jungeblut, C. W., and Zwemer, R. L., Inactivation of Diphtheria Toxin in Vivo and in Vitro by Crystalline Vitamin C, Proc. Soc. Exper. Biol. & Med. **32**: 1229 (May) 1935.

particularly interesting. Two such studies [2] have indicated that there is an increased requirement for vitamin C in tuberculosis and that a somewhat subnormal amount of the substance is excreted daily in the urine. A current contribution [3] presents further data of this type obtained on a group of forty-four patients with mild, moderately advanced or far advanced tuberculosis. The amount of vitamin C excreted daily in the urine was determined by titration against 2-6 dichlorophenylindophenol and the values obtained were classified into four arbitrary groups in the order of their magnitude. The percentage of patients with active tuberculosis was then calculated for each group, with a rather striking outcome. Five of the six patients in the group excreting the smallest amount of vitamin C, from 0 to 5 mg. daily, had active tuberculosis; there was probably some activity also in the sixth. In the second group, which excreted from 5 to 8 mg. daily, active tuberculosis was present in nine of fourteen, or 70 per cent, whereas in the group excreting from 8 to 14 mg. daily only seven of twenty-one, or 33 per cent, showed activity, and in the group excreting over 14 mg. daily only one of thirteen patients, or 7 per cent, showed activity. These results, together with others, seem to indicate that in active tuberculosis there is a decreased excretion of vitamin C or, at least, some substance affecting in a similar manner the method of determining the vitamin. These data may be interpreted as indicating an increased requirement of vitamin C in tuberculosis.

A second type of experiment on the same patients yielded further evidence for an increased vitamin C requirement in tuberculosis. The effect on the urinary excretion of the vitamin resulting from the daily administration of 4 ounces (120 cc.) of orange juice containing 55 mg. of cevitamic acid was determined. This amount of vitamin C is sufficient to cause a definite increase in the amount excreted by the normal person. As in the preceding experiment, definite differences associated with the degree of activity of the disease were seen in the various patients. In eight of ten cases showing active tuberculosis no increase in vitamin C excretion above a minimal arbitrary value occurred, whereas in all fourteen cases showing inactive tuberculosis a significant increase in the excretion of the vitamin occurred. From these data it appears that between 55 and 138 mg. of vitamin C was required daily by patients with active tuberculosis for the maintenance of a normal rate of excretion of the substance. In one patient, 200 mg. of cevitamic acid did not suffice for the maintenance of equilibrium between the intake and the excretion of the vitamin. These amounts stand in distinct contrast to the quantity, from 15 to 30 mg. daily, of vitamin C required by a normal healthy adult.

Although the foregoing evidence appears to indicate definitely the existence of an increased requirement of vitamin C in active tuberculosis, perhaps before final conclusions are drawn several other factors should be considered. The titrimetric procedure for the determination of vitamin C is not entirely specific for cevitamic acid; therefore it would seem that adequate confirmation of the present observations by a different method would be desirable. Also such factors as the possibility of an increase in the excretion of vitamin C through other paths, as the sweat, and possible correlations of the changes in the vitamin requirement in tuberculosis with changes in body temperature should be investigated. In certain diseases, for example, the period of fever appears to be associated with a decreased excretion of vitamin C.

2. Schroeder, Hermann: Die Ausscheidung der Ascorbinsäure im Gesunden und Kranken Organismus, Klin. Wchnschr. **14**: 484 (April 6) 1935. Bulowa, J. G.; Rothstein, I. A.; Ratish, H. D., and Harde, E.: Cevitamic Acid Excretion in Pneumonias and Some Other Pathologic Conditions, Proc. Soc. Exper. Biol. & Med. **34**: 1 (Feb.) 1936.

3. Heise, F. H., and Martin, G. J.: Ascorbic Acid Metabolism in Tuberculosis, Proc. Soc. Exper. Biol. & Med. **34**: 642 (June) 1936.

Current Comment

THE PRESIDENT AND SOCIAL SECURITY

Using the occasion of the dedication of the Jersey City Medical Center, President Franklin D. Roosevelt extended appreciation to the medical profession for its services in the depression. He said:

> Let me with great sincerity give the praise which is due to the doctors of the nation for all that they have done during the depression, often at great sacrifice, in maintaining the standards of care for the sick and in devoting themselves without reservation to the high ideals of their profession.

This statement had been prefaced by a recognition of the fact that the Public Works Administration had increased the capacity of American hospitals by some 50,000 beds. Moreover, the President mentioned the desire of the medical and nursing professions to do more to help families of small income in time of sickness. Particularly interesting to physicians, however, were the words of assurance in which the President intimated a desire to still certain apprehensions which have been prominent in medical discussions for many months. He continued:

> The medical profession can rest assured that the federal administration contemplates no action detrimental to their interests. The action taken in the field of health as shown by the provisions of the splendid social security act recently enacted is clear.
>
> There are four provisions in the social security act which deal with health; and these provisions received the support of outstanding doctors during the hearings before the Congress. The American Medical Association, the American Public Health Association and the State and Territorial Health Officers Conference came out in full support of the public health provisions. The American Child Health Association and the Child Welfare League endorsed the maternal and child health provisions.
>
> This in itself assures that the health plans will be carried out in a manner compatible with our traditional social and political institutions. Let me make that point very clear. All states and territories are now cooperating with the public health service. All states except one are cooperating in maternal and child health service, all states but ten in service to crippled children, and all states but nine in child welfare.
>
> Public support is behind this program. But let me stress, in addition, that the act contains every precaution for insuring the continued support and cooperation of the medical profession.

In the actual administration of the social security act we count on the cooperation in the future, as hitherto, of the whole of the medical profession throughout the country. The overwhelming majority of the doctors of the nation want medicine kept out of politics. On occasions in the past, attempts have been made to put medicine into politics. Such attempts have always failed and always will fail.

Government, state and national, will call upon the doctors of the nation for their advice in the days to come.

The meaning of these words should be clear to all who read. They would seem to signify that the voice of organized medicine has been heard and appreciated in the executive branch of our government. They conclude with a promise of consultation with expert medical advice as new problems arise in the future. The devotion of the medical profession to the public need in our years of stress surely warrants such confidence.

Medical Economics

EVILS OF CONTRACT PRACTICE

Contract practice, in this country, was born of geographic and social necessity. When certain pioneering industries, such as mining, lumbering and construction work, pushed beyond established settlements, such industries were obliged to provide whatever medical facilities were supplied to such isolated communities. This service varied widely in quality but was better than none.

Most modern types of contract practice lack this excuse of necessity. Instead of meeting a lack of facilities in an isolated locality they compete with adequate facilities already established. The motive of establishment is not the benefit of those receiving the service but the possibility of financial gain to those contracting for the delivery of the service. Contract systems are now operated more often to reduce compensation costs, absenteeism, labor turnover, inefficiency and wage payments than to supply needed medical service.

This conclusion as to motive is justified by certain facts. The contract plans do not add to existing services. The features for which their founders fight hardest are those most profitable to industry but not always most helpful to the patients. The managers of the plan insist on choosing the physicians. This choice is determined more by the amounts paid physicians, the character of the medical testimony that will be given in damage suits and compensation cases, and ability to keep down costs than by professional qualifications or devotion to the patient's welfare. The patient is given little or no choice, the most desirable ethical practitioners in the community usually refusing to enter the contract group from which the patient must choose. Contract practice is at present almost universally accompanied by advertising, commercial bargaining, underbidding, subletting, coercion or plain racketeering, and all of these are destructive ingredients in medical service.

If these flagrantly undesirable commercial features could be eliminated, the result of injecting contract practice into the present system of medical practice would still be injurious to the general character of medical service. Contract practice always is restricted to a selected group—generally of adult employees. It leaves uncared for the mass of children, aged, women, unemployed and those most in need of medical service. Such an exclusion, by reducing the field of private practice, inevitably lowers the quality of care it is possible to give to those outside the contract scheme. By thus lowering the standard of medical service in the field with which contract practice must be compared, this situation tends in turn to lower the standards that will be maintained under contract.

Contract medicine is almost exclusively curative medicine. It gives little attention to prevention. The amount of work demanded of each salaried physician is usually so great that he has little time for immunizations and other preventive measures. The restricted coverage makes it impossible to reach the children and others most in need of preventive service. The isolated group character of contract practice does not encourage the contract physicians to become interested in preventive work for an entire community.

Contract practice is so prone to a certain set of defects that they may almost be said to be inherent. Insufficient pay to overworked physicians encourages superficial service. When financial considerations such as compensation are dominant, incidents have been recounted in official investigations of unnecessary amputations to insure an earlier discharge and release from compensation payments, and the use of untrained laymen in giving medical care.

Continuous experience through many years in widely separated localities and under most varied conditions would seem to indicate that it is difficult if not impossible to eliminate these undesirable and dangerous features of contract practice. It is too much to expect that commercial interests, having no knowledge of the principles of medical ethics and no understanding or appreciation of the personal and private relationships that should exist between patient and physician, should devise and administer a system of medical care devoted alike to the interests of the public and of the medical profession.

Association News

ABSTRACT OF MINUTES OF MEETINGS OF BOARD OF TRUSTEES

The Board of Trustees held a two-day session at Association Headquarters in Chicago on September 24 and 25.

CHARLES GORDON HEYD, PRESIDENT

On announcement of the death of the President, Dr. James Tate Mason, the Board declared Dr. Charles Gordon Heyd President, in accordance with the Constitution and By-Laws of the Association.

APPOINTMENTS

In accord with resolutions adopted by the House of Delegates at the Kansas City session, the Board appointed, or authorized the appointment of, committees to study asphyxia, air conditioning, blood grouping, motor vehicle accidents, and the value of x-ray film with paper base as a substitute for film with gelatin base; also an advisory committee on cosmetics. The composition of these committees will be announced later.

Advisory Committee of the Committee on Scientific Exhibit: Dr. Eben J. Carey of Milwaukee to succeed himself for a term of three years, and Dr. James P. Leake of Washington, D. C., to succeed Dr. Hans Zinsser.

Council on Foods: Dr. James S. McLester.

Editorial Advisory Committee for Hygeia: Drs. Olin West, W. W. Bauer, P. A. Teschner, Frank J. Clancy and R. G. Leland.

Representatives on Advisory Committee on Medicine and Public Health of the World's Fair to be held in New York City in 1939: Drs. Nathan B. Van Etten and Arthur W. Booth of New York.

The following appointments, made by mail during the interim between meetings of the Board, were confirmed:

Drs. Franklin G. Ebaugh, J. Allen Jackson, Walter L. Treadway and H. Douglas Singer to represent the Association on the Cooperative Committee for a Survey of Public Mental Hospitals in the United States.

Drs. Roger I. Lee, Nathan B. Van Etten and William C. Woodward to represent the Association at the meeting of the American Bar Association, held in Boston the week of August 24, and Drs. Holman Taylor and E. H. Cary, at the meeting of the American Pharmaceutical Association, held in Dallas, August 24-29.

Dr. C. B. Wright to represent the Association at the dedication of the monument to Dr. Perry H. Millard at Stillwater, Minn., on June 7.

APPROPRIATIONS

Appropriations were authorized to cover the expense of the first meeting of new committees, as well as for the Committee to Study Contraceptive Practices and Related Problems, for special exhibits on fractures and anesthesia for the next annual session of the Association, and for the renewal of the dramatized radio programs.

RESIGNATION OF DR. GEORGE MILLER MAC KEE FROM COUNCIL ON PHYSICAL THERAPY

The resignation of Dr. George Miller MacKee, tendered because of the necessity for curtailing his activities, was accepted with regret and with a statement of the Board's appreciation of the splendid service he has rendered to the Council.

MISCELLANEOUS

Matters pertaining to advertising methods, legislation, governmental activities concerned with medicine and public health, and numerous other subjects were considered on which no action could be taken at this time but which will come before the Board from time to time in the future.

RADIO BROADCASTS

Health Dramas to be Resumed October 13

The American Medical Association and the National Broadcasting Company present the second series of dramatized health broadcasts under the title Your Health, beginning October 13. The first broadcast in the new series will be the thirty-second dramatized cooperative broadcast under the title Your Health. The theme for 1936-1937 will differ slightly from the topic in the first series, which was "medical emergencies and how they are met." The new series will be built around the central idea that "100,000 American physicians in great cities and tiny villages, who are members of the American Medical Association and of county and state medical societies, stand ready, day and night, to serve the American people in sickness and in health."

New England States
WEEI—Boston
WTIC—Hartford
WJAR—Providence
WTAG—Worcester
WCSH—Portland, Me.

Middle Atlantic States
WEAF—New York
KYW—Philadelphia
WCAE—Pittsburgh
WGY—Schenectady
WBEN—Buffalo

West North Central States
KSD—St. Louis
WHO—Des Moines
WOW—Omaha
WDAF—Kansas City
KSTP—Minneapolis-St. Paul
WEBC—Duluth-Superior
WDAY—Fargo
KFYR—Bismarck

East North Central States
WTAM—Cleveland
WLW—Cincinnati
WSAI—Cincinnati
WCKY—Cincinnati
WWJ—Detroit
WMAQ—Chicago
WTMJ—Milwaukee
WIBA—Madison
WHIO—Dayton
WIRE—Indianapolis
WOOD—Grand Rapids

West South Central States
WSMB—New Orleans
KVOO—Tulsa
WKY—Oklahoma City
WFAA—Dallas, Fort Worth
WBAP—Dallas, Fort Worth
KTHS—Hot Springs
KTBS—Shreveport
KPRC—Houston
WOAI—San Antonio

South Atlantic States
WFBR—Baltimore
WRC—Washington
WRVA—Richmond
WTAR—Norfolk
WFBC—Greenville, S. C.
WCSC—Charleston, S. C.
WSOC—Charlotte
WPTF—Raleigh
WWNC—Asheville
WIS—Columbia
WJAX—Jacksonville
WFLA—Tampa
WSUN—Tampa
WIOD—Miami
WSB—Atlanta

East South Central States
WAVE—Louisville
WSM—Nashville
WMC—Memphis
WAPI—Birmingham
WJDX—Jackson

Mountain States
KTAR—Phoenix
KGIR—Butte
KGHL—Billings
KOA—Denver
KDYL—Salt Lake City

Pacific States
KPO—San Francisco
KFI—Los Angeles
KGW—Portland, Ore.
KOMO—Seattle
KHQ—Spokane

Canada
CRCT—Toronto
CFCF—Montreal

Hawaii
KGU—Honolulu

The program will be on the Red network and Pacific network of the National Broadcasting Company. The stations listed above are those to which the program is available.

It should be noted that a station may take the program or not. If a station included in the list is not broadcasting the program Your Health, it is possible that the management may be induced to broadcast the program if it receives evidences of local interest. The committee on education or other appropriate committee of the local medical society might take this matter up with the station management and tender cooperation in giving the program local publicity.

The topics are announced monthly in advance in *Hygeia*, the Health Magazine, and three weeks in advance in each weekly issue of THE JOURNAL. The topics and speakers for October are as follows:

October 13. What to Do for Blind Children. W. W. Bauer, M.D.
October 20. Arthritis. Morris Fishbein, M.D.
October 27. Help for the Deafened. W. W. Bauer, M.D.

The time of the broadcast is Tuesday afternoon at 5 o'clock eastern standard time (4 o'clock central time, 3 o'clock mountain time, 2 o'clock Pacific time).

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Plague Infection.—According to *Public Health Reports*, plague infection has recently been proved, by animal inoculation, in four ground squirrels received at the laboratory of the state department of public health from localities near Hackamore, in Modoc National Forest, Modoc County.

Society News.—The Hollywood Academy of Medicine was addressed, September 24, by Dr. Fred L. Soper, Rio de Janeiro, Brazil, on "Jungle Yellow Fever: New Epidemiologic Entities in South America."——Dr. Oswald S. Lowsley, New York, addressed the San Francisco chapter of the Pan American Medical Association, September 23, on "Modern Renal Surgery," and conducted a clinic at the San Francisco County Hospital.——At a special meeting of the staff of Peralta Hospital, Oakland, Dr. Olin H. Garrison presented a case report on pernicious anemia and Dr. Edward F. Roberts, New York, gave an illustrated address entitled "Pernicious Anemia and Parenteral Liver Therapy."——The San Francisco County Medical Society will be addressed October 13 by Dr. Howard C. Naffziger, San Francisco, on "Progressive or Malignant Exophthalmos Related to Thyroid Disease."

CONNECTICUT

Sir Joseph Barcroft Gives Terry Lectures.—Sir Joseph Barcroft, professor of physiology, University of Cambridge, England, delivered the Terry Lectures at Yale University, October 5-7, on "Three Aspects of the Relation of Environment to Organism." The titles of the individual lectures were "Mental Efficiency Considered in Relation to Some Properties of the Blood," "Origins of Behavior in the Fetal Environment" and "The Transition from Fetal to Neonatal Conditions."

DISTRICT OF COLUMBIA

Society News.—The Medical Society of the District of Columbia will be addressed, October 21, by Drs. William J. Mallory, John A. Reed and Maurice Protas on "Observations on the Use of Insulin Protaminate in the Treatment of Diabetes Mellitus," and Dr. Garnet W. Alt, "Recent Advances in Proctology." Edmund A. Walsh, Ph.D., will address the society October 14.

Personal.—Dr. Arthur C. Christie was recently elected to honorary membership in the Società Italiana di Radiologia Medica and in the Deutsche Röntgen-Gesellschaft.——Dr. William A. Warfield Sr., for forty years surgeon-in-chief of Freedmen's Hospital, a government institution, will be retired November 17, newspapers announce. Dr. Warfield is professor of abdominal surgery at Howard University College of Medicine. Dr. Thomas Edward Jones will succeed Dr. Warfield at the hospital.

FLORIDA

New Dental Bureau.—The state board of health has created a new bureau of dental health with E. C. Geiger, D.D.S., Jacksonville, in charge. It is planned to carry out a program of dental health education that will include the examination of every school child in the state. Recommendations will be made to parents, and in cases of underprivileged children a plan for free dentistry is being worked out, it is reported. A recent survey of school children of the state revealed that from 75 to 90 per cent of those examined were suffering from dental defects.

IDAHO

Society News.—Drs. William F. Passer, Twin Falls, and Joseph N. Davis, Kimberly, addressed the South Side Medical Society, Twin Falls, recently, on "Infant Feeding" and "The Rocky Mountain Spotted Fever Tick" respectively.

ILLINOIS

Prevalence of Poliomyelitis.—A record of 206 cases of infantile paralysis in Illinois in September was the highest monthly total of cases of this disease since 1917, according to the Chicago *Tribune* September 28. Because of the general increase in prevalence throughout the state, the Illinois department of health has requested volunteer contributions of blood from persons who have recovered from the disease in the last fifteen years.

Society News.—Dr. Franklin E. Walton, St. Louis, addressed the Vermilion County Medical Society in Danville, September 2, on "Diagnosis and Management of Biliary Tract Diseases."——Dr. Earl O. Latimer, Chicago, addressed the Will-Grundy County Medical Society, September 30, on treatment of appendicitis.——At a meeting of the Du Page County Medical Society, September 16, Dr. Clarence J. McMullen, Chicago, spoke on diabetes mellitus.——Speakers before the La Salle County Medical Society in Ottawa, September 23, were Drs. Jacob J. Singer, St. Louis, on "Diagnostic Methods in Obscure Chest Conditions," and Millard F. Arbuckle, St. Louis, "Pulmonary Conditions Revealed by the Bronchoscope."——Dr. William H. Holmes, Chicago, discussed undulant fever before the Sangamon County Medical Society, October 1.——At a meeting of the Dewitt County Medical Society in Clinton, September 23, Dr. Robert S. Berghoff, Chicago, spoke on heart disease.

Chicago

Personal.—Dr. Mary Stone, head of the Bethel mission center, Shanghai, China, was guest of honor at a dinner given by women physicians of Chicago at the Women and Children's Hospital.

The Bacon Lectures.—Dr. Frank W. Lynch, professor and head of the department of obstetrics and gynecology, University of California School of Medicine, San Francisco, will deliver the seventh annual Charles Sumner Bacon Lectures at the University of Illinois College of Medicine, October 16 and October 23. Dr. Lynch's subjects will be "Carcinoma of the Uterus" and "Uterine Fibroids."

Society News.—The Chicago Council of Medical Women was addressed October 2 by Dr. Esther T. Frankel on "Indications for Physiotherapy."——Dr. George E. Bennett, Baltimore, addressed the Chicago Orthopaedic Society, October 9, on "Acute, Recurrent and Old Dislocations of the Shoulder," and Drs. Paul H. Harmon and Carroll O. Adams, "Pyogenic Arthritis of the Hip, with Special Reference to Pathological Dislocation and Treatment."

Mills Foundation Aids Work on Cancer.—Wesley Memorial Hospital announces the receipt of an annual allotment from the Davella Mills Foundation, Montclair, N. J., for the treatment of cancer patients and research on cancer. The sum of $7,500 was allotted for 1936 and in June of each year an appropriation will be made. The Davella Mills Foundation was created in 1934 by Mr. David B. Mills and his wife Ella. The income is used to further the activities of several philanthropies.

INDIANA

Society News.—Dr. Bert E. Ellis, Indianapolis, discussed "Obstruction of the Larynx" before the Fayette-Franklin Medical Society in Brookville, September 8.——Dr. Charles P. Emerson, Indianapolis, addressed the Gibson County Medical Society in Princeton, September 14, on "Later Developments in the Early Recognition, Treatment and Control of Cancer."——Dr. Baruch M. Edlavitch, Fort Wayne, presented a clinical study of insulin protaminate before the Fort Wayne Medical Society, September 15.——At a meeting of the Madison County Medical Society in Anderson, September 21, Dr. Henry O. Mertz, Indianapolis, discussed "Relation of Urological Diseases to the Differential Diagnosis of General Abdominal Diseases."——Dr. Frank Forry, Indianapolis, addressed the Carroll County Medical Society in Burlington, September 10, on cancer.——The Hendricks County Medical Society was addressed in Danville, September 17, by Dr. Jewett V. Reed, Indianapolis, on "Injuries of the Skull and Traffic Accidents of the Day."——Dr. Roscoe L. Sensenich, South Bend, addressed the Tippecanoe County Medical Society at Lafayette, recently, on "Political Trends Today Affecting Medical Practice."

KENTUCKY

New Health Officers.—Dr. James W. Miller, recently health officer of Gallatin County at Warsaw, has been transferred to Green County to succeed Dr. Jesse M. Dishman, Greensburg, recently appointed in Caldwell County. Dr. Emil A. Steiner, Cleveland, Ohio, has been appointed in Pulaski County and Dr. James O. Nall, recently of Murray, in Trigg County.

LOUISIANA

Health at New Orleans.—Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million, for the week ended September 26, indicate that the highest mortality rate (18.7) appears for New Orleans and for the group of cities as a whole, 10.2. The mortality rate for New Orleans for the corresponding period last year was 17.4 and for the group of cities 10. The annual rate for eighty-six cities for the thirty-nine weeks of 1936 was 12.2 as against a rate of 11.4 for the corresponding period of the previous year. Caution should be used in the interpretation of these weekly figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have a large Negro population may tend to increase the death rate.

MASSACHUSETTS

Honorary Degrees Conferred at Harvard Tercentenary.—At the exercises commemorating the tercentenary of Harvard University, September 18, honorary degrees of doctor of science were conferred on the following, among others, who took part in the conferences:

Dr. Edgar Douglas Adrian, Foulerton professor of physiology of the Royal Society and fellow of the Trinity College, Cambridge.

Sir Joseph Barcroft, professor of physiology, University of Cambridge.

Dr. James B. Collip, professor of biochemistry, McGill University Faculty of Medicine, Montreal.

Dr. Ross Granville Harrison, Sterling professor of biology, Yale University School of Medicine, New Haven, Conn.

Sir Frederick Gowland Hopkins, professor of biochemistry, University of Cambridge.

Dr. Bernardo A. Houssay, director, Institute of Physiology, Buenos Aires.

Dr. Pierre Marie Felix Janet, professor of psychology, College of France, Paris, France.

Dr. Carl Gustav Jung, Küsmucht, near Zurich, Switzerland.

Dr. August Krogh, director of the Zoophysiologic Laboratory at the University of Copenhagen.

Dr. Karl Landsteiner, Rockefeller Institute for Medical Research, New York.

Dr. Kiyoshi Shiga, president of the Governmental University, Keijo, Chosen, Korea.

Dr. Hans Spemann, professor of zoology, Faculty of Natural Sciences and Mathematics, University of Freiberg, Germany.

MICHIGAN

State Medical Election.—Dr. Henry Cook, Flint, was chosen president-elect of the Michigan State Medical Society at its annual meeting in Detroit, September 21-24, and Dr. Henry E. Perry, Newberry, was installed as president.

Society News.—Dr. Géza de Takáts, Chicago, addressed the Calhoun County Medical Society in Battle Creek, September 1, on "Treatment of Varicose Veins."——The Allegan County Medical Society was organized, August 18, with Drs. George H. Rigterink, Hamilton, as president; Olin H. Stuck, Otsego, vice president; Morley B. Beckett, Allegan, county health officer, secretary, and Roy A. MacNeill, Allegan, treasurer.——Dr. Louis B. Wilson, Rochester, Minn., gave a lecture in the graduate series sponsored by the Wayne County Medical Society, Detroit, October 5; his subject was "National Specialty Qualifying Boards in Relation to Graduate Medical Education."——The opening meeting of the new season of the West Side Medical Society, Detroit, October 1, was addressed by Drs. Warren O. Nelson and Charles G. Johnston, both of Detroit, on "Some Endocrine Influences in Atypical Growth" and "Some Problems Relating to the Care of the Patient with Gallbladder Disease" respectively.

NEW MEXICO

Personal.—Dr. James R. Scott, Albuquerque, has resigned as health officer of the third district; Dr. Julian O. Long has been provisionally appointed to succeed him.

Hospital News.—A ten bed private hospital was recently opened at Tularosa, with Dr. Clyde H. Hemphill as chief of staff; Dr. Leo R. Gaddis, Alamogordo, chief surgeon, and Dr. John D. Robinson, in charge of general medicine. It is known as the Hemphill Hospital.

County Health Demonstration.—San Miguel County has been selected for a demonstration of public health service as part of a statewide plan for maternal and child health services, with funds derived in part from the county and in part from money allotted to the state by the U. S. Children's Bureau under the Social Security Act. The program as outlined in the *New Mexico Health Officer* includes general public health nursing with particular attention to health education; to cooperate with New Mexico Normal University in a plan that includes extension of health education in the county, and establishment of antepartum, maternal, infant welfare, preschool and school children's clinics for promotion of public health. These clinics will be held if possible in cooperation with the local medical society, according to the bulletin.

NEW YORK

Society News.—The New York State Association of Public Health Laboratories will hold its midyear meeting November 6 at the state laboratory in Albany.——Dr. Robert P. Dobbie, Buffalo, addressed the Medical Society of the County of Niagara September 8 on surgery of the biliary tract.——Motion pictures by Drs. Allen B. Kanavel, Chicago, on "Diagnosis and Treatment of Infections of the Hand" and Grover C. Penberthy, Detroit, on "Treatment of Burns" were shown at a meeting of the Dutchess County Medical Society, Poughkeepsie, September 9.

New Buildings for Crippled Children's Hospital.—Several new buildings at the New York State Reconstruction Hospital at West Haverstraw were dedicated September 24. The buildings, which have been built since the transfer of the institution to the state department of health in 1931, consist of two wards, a school for all grades through high school, a dining room and kitchen, a power plant and a treatment center. The treatment center includes facilities for electric massage, electrotherapy and hydrotherapy, a large recreational and correctional swimming pool and two smaller treatment pools. Governor Lehman gave the dedicatory address and other speakers were Drs. Edward S. Godfrey Jr., state health commissioner, and Walter Thompson, president of the hospital's board of visitors.

New York City

Serum Laboratory Established.—The Manhattan Convalescent Serum Laboratory has been established in the research laboratory of the department of health for preparation and distribution of immune serums for measles, scarlet fever and other communicable diseases. Dr. William Thalhimer is in charge of the new service.

Personal.—Mr. Lawrence K. Frank, formerly associate director of education of the General Education Board, has been appointed assistant to the president of the Josiah Macy Jr. Foundation. Dr. Ludwig W. Kast is the president.——Drs. Edgar Mayer and James Burns Amberson Jr. have been appointed by the state industrial commissioner as consultants on dust diseases.

Society News.—A symposium on obstetrics was presented at the meeting of the Medical Society of the County of Queens, September 29, by Drs. Edward S. Godfrey Jr., Albany, state health commissioner; Harriet M. White, Richmond Hill; Moses Cohen, Long Island City; Henry C. Eichacker, Brooklyn; Walter H. Kerby, Woodhaven; George J. Lawrence, Flushing, and James P. McManus, Hollis.——The second series of lectures to the public sponsored by the New York Academy of Medicine was begun October 8 by Dr. Smith Ely Jelliffe, who spoke on "The Historical Background of Psychiatry."

NORTH CAROLINA

Society News.—Drs. William G. Bandy and John W. Saine, Lincolnton, addressed the Catawba Valley Medical Society, Hickory, September 8, on "Diagnosis and Treatment of the Common Causes of Indigestion" and "Purpura Haemorrhagica" respectively.——Dr. John H. Musser, New Orleans, addressed the Buncombe County Medical Society, Asheville, August 24, on coronary occlusion.

Personal.—Dr. Martin L. Stevens, Asheville, has been appointed a member of the board of trustees of the state tuberculosis sanatoriums.——Dr. Paul P. McCain, superintendent of the State Sanatorium, Sanatorium, received the honorary degree of doctor of laws at the annual commencement of the University of North Carolina.—Dr. Ruth M. Collings, assistant physician to Woman's College of the University of North Carolina, Greensboro, has been appointed college physician to succeed Dr. Anna M. Gove, who has retired. Dr. Maria S. Naples, Cleveland, Ohio, has been appointed assistant.——Dr. Alfred D. Gregg, Liberty, has been appointed health officer of Vance County, succeeding Dr. Zack P. Mitchell, Henderson, who has been appointed health officer of Swain and Graham counties.

OHIO

Personal.—Dr. Paul C. Bratten, New Bremen, has been appointed health officer of Shelby County to succeed the late Dr. Alfred B. Lippert.——Dr. Gordon E. Savage, Osborn, has been appointed health officer of Greene County; heretofore the position has been half time.

Fiftieth Anniversary of Practice.—The Tuscarawas County Medical Society entertained Dr. Byron G. Anderson, Uhrichsville, at a dinner September 10 in honor of his fiftieth anniversary of medical practice. Speakers who paid tribute to the 78 year old physician included Drs. Jonathan Forman, Columbus; Elliott D. Moore and John M. Smith, New Philadelphia; Daniel W. Shumaker, Dover, and Mr. Charles S. Nelson, Columbus, secretary, Ohio State Medical Association.

Society News.—Dr. John A. Toomey, Cleveland, addressed the Columbus Academy of Medicine, September 28, on "Differential Diagnosis of Epidemic Meningitis and Other Meningeal Irritations."——Dr. Paul W. Palmer, Lorado, W. Va., addressed the Fayette County Medical Society, Washington Courthouse, September 3, on hemorrhoids.——Speakers at a meeting of the Miami County Medical Society in Troy, September 4, were Drs. Lauren N. Lindenberger, Troy, on "Indications for Cesarean Section" and George R. Upton, Piqua, "Surgical Technic for Cesarean Section."——Dr. Raymond C. McKay, Cleveland, addressed the Mahoning County Medical Society, September 15, on "Collapse Treatment of Pulmonary Tuberculosis."——Dr. Max M. Zinninger, Cincinnati, addressed the Auglaize County Medical Society in St. Marys, September 17, on "Diagnosis and Treatment of Acute Abdominal Emergencies."——Dr. Morris Fishbein, Chicago, editor of THE JOURNAL, addressed the Academy of Medicine of Cincinnati, October 6, on "New Plans for Medical Service."

OKLAHOMA

Society News.—Dr. Henry H. Turner, Oklahoma City, addressed the September meeting of the Garfield County Medical Society at Enid on the endocrine glands.——At a meeting of the Southern Oklahoma Medical Association in Norman September 1 speakers were Drs. Wendell Long, on "Treatment of Menorrhagia"; Raymond Murdock, "Diagnosis and Treatment of Rectal Diseases," and Kelley West, "Colles Fractures and Associated Fractures of the Wrist." All the speakers are from Oklahoma City.

PENNSYLVANIA

Personal.—At a meeting of the state board of medical education and licensure, August 27, James A. Newpher was elected secretary of the board to succeed Clarence E. Ackley.

Society News.—Dr. Grover C. Penberthy, Detroit, addressed the Erie County Medical Society, September 8, on "Ten Years' Study of Empyema in Children."——Dr. Walter F. Donaldson, Pittsburgh, secretary, Medical Society of the State of Pennsylvania, addressed the Dauphin County Medical Society, Harrisburg, September 2, on "Social and Economic Problems Facing the Medical Profession Today."——Dr. Bernard J. Alpers, Philadelphia, addressed the Harrisburg Academy of Medicine September 15 on "Nervous Complications Encountered in General Practice."——Dr. Charles A. Behney, Philadelphia, addressed the Cumberland County Medical Society in Carlisle in September, on "Excision of the Sympathetic Nerves for the Relief of Pelvic Pain."

Philadelphia

Personal.—Dr. and Mrs. David W. Levy celebrated their fiftieth wedding anniversary September 21.——Dr. Edward Martin, Media, has been elected president of the Philadelphia board of education.

Society News.—A symposium on prevention of tuberculosis will be presented before the Philadelphia County Medical Society October 14 by Drs. Esmond R. Long, William G. Turnbull and Frank A. Craig, Philadelphia, and Edith E. MacBride-

Dexter, Harrisburg, state secretary of health.——Speakers before the Obstetrical Society of Philadelphia October 1 were Drs. Fred B. Nugent, Reading, Pa., on "The Primiparous Genitalia After Forceps Delivery"; Walter Sussman, "A New Method for the Control of the Early Nausea and Vomiting of Pregnancy" and I. Charles Lintgen, "The Incidence of Ureteral Stricture in Lower Abdominal Pain in Women."——Drs. Arthur Finkelstein, Wilmington, Del., and George W. Chamberlin addressed the Philadelphia Roentgen Ray Society, October 8, on "Roentgen Studies of the Ischiopubic Junction" and "Treatment of Hypophyseal Stalk Tumors by Evacuation and Irradiation."——At a meeting of the Philadelphia Academy of Surgery, October 5, speakers were Drs. Isidor S. Ravdin and Jonathan E. Rhoads, on "Terminal Ileitis"; Lynn M. Rankin, "Acute Fractures of the Pelvis," and George M. Dorrance, "Treatment of Webbed Fingers: Proper Age of Operation." Dr. Francis C. Grant presented a memoir to the late Dr. Charles H. Frazier.

Pittsburgh

Hospital News.—The annual "Mercy Day" reunion was held at Mercy Hospital, September 24, with Dr. Frank H. Lahey, Boston, as guest speaker on disease of the gallbladder.

Society News.—Drs. Harry M. Margolis and Philip A. Faix addressed the Allegheny County Medical Society, September 15, on "Clinical Use of Insulin Protaminate" and "Review of the Anesthetic Agents and Methods Used in 1936" respectively, and Dr. Simon H. Ratner reported a case of pulmonary mycosis.

TEXAS

State Provides Quarters for Visiting Physicians.—Through a provision of the appropriation bill passed by the last legislature, graduate instruction for practicing physicians is to be made available at the State Tuberculosis Sanatorium, Sanatorium, and the sanatorium has built a cottage as a residence for the visiting physicians. The cottage was to be ready for occupancy October 1, with quarters for eight physicians. Special courses will be given in artificial pneumothorax, phrenic nerve operations and x-ray studies. The cost of the new building was about $13,000.

Society News.—Drs. Herbert M. Westphal, Weslaco, and Loyal H. Moore, McAllen, addressed the Hidalgo-Starr Counties Medical Society, July 16, on "Undulant Fever" and "Treatment of Common Diseases of the Middle and External Ear" respectively.——Dr. James M. Hooks, Paris, addressed the Lamar County Medical Society, Paris, July 2, on chronic ulcers.——Drs. William A. Smith and Seaborn J. Lewis, Beaumont, discussed "Epithelioma" and "Laboratory Technic in Diagnosis" respectively before a meeting of the Liberty-Chambers Counties Medical Society, Anahuac, July 11.——Speakers before the Palo Pinto County Medical Society, Mineral Wells, July 6, were Drs. Joe H. McCracken and Waldo B. Lasater, Mineral Wells, on diseases of the thyroid gland.——The Texas Public Health Association will hold its annual meeting in Kilgore, October 14-16. Among speakers will be Drs. Reginald M. Atwater, New York, executive secretary, American Public Health Association; John Rosslyn Earp, state health officer, New Mexico, Santa Fe; Howard R. Dudgeon, Waco, president, State Medical Association of Texas, and Martha M. Eliot, Washington, D. C., assistant chief, U. S. Children's Bureau.——Dr. Charles E. Collins, Waco, addressed the Hill County Medical Society, Hillsboro, in September on "The Heart in Surgical Mortality."——At the meeting of the Dallas County Medical Society, Dallas, October 22, speakers will be Drs. Thomas H. Cheavens and Charles F. Carter, on "Mental Disturbance Due to Bromide Intoxication" and Addison Gerald Moore, Camden, Ind., on "Hypertension and Cardiac Complications."

VERMONT

State Medical Meeting at Burlington, October 15-16.—The one hundred and twenty-third annual meeting of the Vermont State Medical Society will be held in Burlington, October 15-16. A preliminary program lists the following speakers, among others:

Dr. John H. J. Upham, Columbus, Ohio, President-Elect, American Medical Association, Heart Disease in Middle and Past Middle Life.
Dr. Adolphus D. Rood, Springfield, Mass., Postoperative Pulmonary Atelectasis.
Dr. Royd R. Sayers, Washington, D. C., Respiratory Dust Diseases.
Dr. Doris A. Murray, Washington, D. C., Maternal and Child Health.
Dr. Franklin P. Lowry, Newton, Mass., The Value of Physical Therapy in the Practice of Medicine.
Dr. Guy L. Hunner, Baltimore, The Urinary Track in Relation to Diagnosis of Abdominal and Pelvic Lesions.

There will also be a symposium on vascular diseases with the following speakers, all of Boston: Drs. Robert S. Palmer, Theodore C. Pratt, Robert R. Linton, Henry H. Faxon and Reginald H. Smithwick. Dr. Lester W. Burbank, Cabot, is president of the society.

WEST VIRGINIA

Personal.—Dr. Jesse A. Jamison has resigned as health officer of Fairmont after fifteen years' service.——Dr. Rexford A. Burdette, Charleston, has been named director of the Monongalia County health department, succeeding Dr. Robert C. Farrier, who recently resigned to accept a similar position in Delta County, Mich.

University News.—A college of pharmacy has been established at the University of West Virginia, replacing the former department of pharmacy in the school of medicine. Prof. Joseph L. Hayman, former head of the department, will be director of the new college. Dr. Jerome E. Andes, Warrensburg, Mo., has been appointed assistant professor of pathology. Dr. Andes graduated from the Louisiana State University Medical Center in June. In 1932 he received his degree of doctor of philosophy from Western Reserve University. He is 32 years of age.

GENERAL

Outbreaks of Typhoid.—Seventeen cases of typhoid fever among workers on a highway project near Carlisle, Pa., were reported by newspapers September 15. There was one death. It was found that the workmen drank from a pipe line from a stream which was contaminated.——Two deaths have occurred in an outbreak of forty-two cases at the Columbus State Hospital, Columbus, Ohio, it was reported September 10.——Forty-nine cases with three deaths had occurred in the outbreak in Englewood, N. J., and surrounding towns up to September 22. This epidemic was attributed to a spring in Englewood.

Special Broadcast on Y. M. C. A. Anniversary.—The New York City division of the Young Men's Christian Association announces a special broadcast October 11 to observe the one hundred and fifteenth anniversary of the birth of Sir George Williams, founder of the organization. Speakers in the broadcast, which will be from 4:30 to 5 p. m., eastern standard time, will include, among others, J. Edgar Hoover, director of the Federal Bureau of Investigation; Dr. Morris Fishbein, Chicago, editor of THE JOURNAL; Miss Mildred H. McAfee, president of Wellesley College, Wellesley, Mass., and Eddie Cantor, Hollywood. The Y. M. C. A. was founded by Sir George in England ninety-two years ago.

Bequests and Donations.—The following bequests and donations have recently been announced:

Pennsylvania Hospital, Episcopal Hospital, Home of the Merciful Savior for Crippled Children and the Home for Incurables, Philadelphia, are among institutions that will eventually receive one sixteenth of the estate of Frederick McOwen, estimated at more than $4,000,000.

Montefiore Hospital, New York, $1,000 from the estate of the late Ida H. Saks.

St. Joseph's Hospital for Consumptives, Bronx, $1,000 by the will of the late Ann Dillon.

Pennsylvania Hospital, Philadelphia, $21,000 by the will of Miss Emily Fell Dawson.

St. Luke's Hospital, Chicago, $20,000 by the will of the late Mrs. Grace Witbeck Barrell.

Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, $50,000 to equip a cancer treatment room, by the will of Mrs. Mary L. C. Earle.

Jefferson Medical College, Philadelphia, $5,000 from the estate of the late Dr. Thomas Macrae.

Lebanon and Montefiore hospitals for chronic diseases, New York, $1,000 each by the will of Rudolph H. Abraham.

St. Joseph's Hospital, Yonkers, N. Y., $1,000 by the will of Edward J. Doran.

Presbyterian and New York hospitals, New York, each $2,201,491 by the will of the late Mary Gardiner Thompson.

St. Luke's Hospital, New York, $42,500; National Society for Prevention of Blindness, $5,000, and the New York State Reconstruction Home, West Haverstraw, $5,000 by the will of the late George Blagden. St. Luke's will also receive half the residuary estate after the death of named beneficiaries; the estate was valued at nearly $5,000,000.

Public Health Meeting.—The sixty-fifth annual meeting of the American Public Health Association will be held in New Orleans, October 20-23. The preliminary program includes the following speakers:

Dr. John Sundwall, Ann Arbor, Mich., Training of Vital Statisticians.
Fred W. Tanner, Ph.D., Urbana, Ill., Problems in Food Preservation.
Dr. Thomas Francis Jr., New York, Epidemiologic Studies in Influenza.
Dr. Martha M. Eliot, Washington, D. C., Infant and Maternal Welfare from the Aspect of Social Security.
Dr. Royd R. Sayers, Washington, D. C., Industrial Hygiene Activities in the United States.
Dr. William Lloyd Aycock, Boston, The Nature of Autarcesiologic Susceptibility to Poliomyelitis.

Special sessions will be devoted to mental hygiene, advances in public health and mosquito-borne diseases. There will be symposiums on milk and dairy products, enteric fevers, syph-

ilis, food poisoning, sanitation of eating utensils, and intestinal parasites, including protozoa. One session on public health education will be addressed by Mr. Howard Blakeslee, science editor of the Associated Press, New York, on "The Newspaper—Science in the Press—The Daily, the Weekly, and the Interests of the Readers of Each," and Miss Judith Waller, educational director, central division, National Broadcasting Company, Chicago, "The Radio." The first general session will be held Tuesday evening, when Dr. Thomas Parran, surgeon general, U. S. Public Health Service, Washington, D. C., will deliver his address as president-elect of the association. On this occasion the winner of the Sedgwick Memorial Medal will be announced. The American Association of School Physicians, the Association of Women in Public Health and Delta Omega will also meet during this time.

FOREIGN

Survey of Rural Hygiene.—A commission from the League of Nations is making a survey of rural hygiene in countries of the Far East preparatory to a conference to be held in Java in August 1937. Mr. A. S. Haynes, formerly colonial secretary in Malaya, is head of the commission, which visited the Philippine Islands in June and was to go later to the Dutch East Indies, Singapore and South India.

Traffic Signs Direct Travelers to Physicians.—Directions for reaching the nearest physician are being added to traffic signs near dangerous curves and intersections in Czechoslovakia, according to a report to the U. S. Department of Commerce from the commercial attaché in Prague. It is believed that the psychologic effect is excellent and that the information is of value in case of accidents. An inscription giving the location and distance to the nearest physician is placed below a red field in a blue frame.

Typhoid Outbreak at British Resort.—Three hundred and eighty-five cases of typhoid were reported between August 21 and September 4 in Bournemouth, England, and two adjacent towns, Poole and Christchurch. It was found that the infection came from unpasteurized milk, and treatment of the offending supply was begun at once. At Bournemouth it was necessary to take over a large house to provide extra hospital accommodations for the patients. Bournemouth had 222 with seven deaths, Poole 143 with two deaths, and Christchurch 20.

Government Services

Changes in Public Health Service

Drs. Ernest E. Huber and Clifford R. Eskey have been promoted and commissioned as surgeon and senior surgeon respectively in the regular corps of the U. S. Public Health Service. Other changes in the service include the following transfers:

Passed Asst. Surg. Frederick Paul Burow, relieved at Hamburg, Germany, on arrival of Sr. Surg. Herbert A. Spencer, and assigned to Naples, Italy, for duty in the office of the consul general.

Passed Asst. Surg. Mason V. Hargett, relieved at Stuttgart and ordered to London, England, for duty in office of American consulate.

Surg. Walter G. Nelson, relieved at Naples, Italy, and assigned to Berlin, Germany.

Medical Director Claude H. Lavinder, relieved as chief medical officer of U. S. Marine Hospital, Ellis Island, N. Y., and directed to assume charge as director of public health district number 1, comprising the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York and New Jersey.

Maryland and the Social Security Program

The plan of Maryland to provide care for its crippled children under the social security program was approved August 1. This makes thirty-seven states and the District of Columbia and Alaska with these plans. Eleven states and Hawaii have not yet been able to make adequate arrangements for participation, although in some cases the necessary preliminaries can be completed soon and grants under the 1937 appropriation made. During the first five months of the year, $732,492.33 was paid to the thirty-six participating states, Alaska and the District of Columbia. The sum available for apportionment during the fiscal year ending June 30, 1937, is $2,450,000, based on a specific allocation for all the states, Alaska, Hawaii and the District. A total of $400,000 remains to be apportioned on the basis of the number of crippled children in need of care, relative costs of care, and state funds available. This allotment cannot be made until all state plans for the period covered have been received.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 1, 1936.

Report on the Treatment of Dementia Paralytica

The Mental Hospitals Committee of the London County Council has made an important report on the treatment of dementia paralytica. Because of its vast hospital system, the council has on this subject experience at its disposal on a scale impossible elsewhere. For some time Dr. F. L. Golla, director of the central pathologic laboratory at the Maudsley Hospital, has been engaged in coordinating the treatment of dementia paralytica at all the council's hospitals, keeping records and following up the after-histories of patients who were discharged after treatment. It is pointed out in the report that before the advent of modern therapy there was no real recovery from the disease. A few patients might linger on for a number of years, in exceptional cases for a long period, but the discharge rate was insignificant and the majority of patients died within a short time of admission. In the six years 1908-1913 there were 2,545 cases of dementia paralytica in the council's mental hospitals. Of these, 2,034 (almost 80 per cent) proved fatal. The modern treatment was not then in use. Comparison is made with the six years 1930-1935, when 1,914 cases were in the hospitals and the modern treatment was used in every case in which this was possible. The untreated patients comprised those admitted moribund or suffering from grave physical disabilities which rendered active treatment impossible. Eighty-five per cent of the patients received some special form of treatment, 78 per cent pyrexial therapy with or without drug treatment, and 7 per cent drug treatment only. On Dec. 31, 1935, 782 of the patients (40.8 per cent) had died, seventy-eight were taken out of the council's care, 379 (19.18 per cent) were discharged and 430 remained in the hospital. Comparison of the two series of cases shows that: 1. Even in the total of treated and untreated cases the mortality rate had been halved. 2. One fifth of the cases in the second series had been discharged, the cure in the majority being permanent. Many of the persons discharged are now filling positions of responsibility. 3. There is an increase of 208 in the resident dementia paralytica cases, which is made up of cases in which the lethal progress has been arrested but the mental symptoms have not permitted discharge from care. The pyrexial treatment was carried out with malaria and drugs, the specific drug treatment, and by various preparations of arsenic and bismuth.

The Fitting of Artificial Limbs

The work of the ministry of pensions in providing artificial limbs for the victims of the great war has resulted in the creation of a highly specialized and efficient organization at Queen Mary's Hospital, Roehampton and affiliated centers throughout the British Isles. The unprecedented demand for limbs has been a stimulus to the production of improved technical devices and higher standards of material and workmanship, which have been guided by the surgeons responsible for selecting the most suitable type and supervising the fitting. The specialized knowledge and experience acquired has been freely communicated to the medical profession. Lectures and demonstrations on amputation stumps and on the fitting of artificial limbs have been given to medical representatives of various public services and medical schools. During 1935 no fewer than 132 surgeons attended these lectures. There has been a widely expressed wish that the benefit of the military service should be extended to civilians, which has already been

done in the case of civilians living near or in London. With a view to the extension of the benefits, the minister of pensions was requested to allow the services of the limb-fitting surgeons in the provinces to be made available. They were consulted in the matter and their replies show that they recognize the deficiencies of the existing practice, in which the patients are largely dependent on the makers of artificial limbs, whose knowledge of anatomy may or may not be adequate. The minister has therefore granted the request. Under an agreement to be entered into, fees will be charged which will cover all expenses incurred by the ministry of pensions. The new arrangement will not be allowed to interfere with the practice of any independent surgeon who may wish to supervise the adjustment of an artificial limb in a case in which he has been concerned, or with the supply of artificial limbs by any firm of limb makers that it may be desired to employ.

The Influence of Diet on Caries

The Committee for the Investigation of Dental Disease, appointed by the Medical Research Council, has issued a final report. The earlier reports gave the results of Mrs. May Mellanby's well known experiments on animals and children, which have been reviewed in previous letters. She produced a large mass of evidence to show that nutrition and not oral hygiene, as was supposed, was the main factor in the decay of teeth. She showed that the liability of a tooth to decay depended largely on the perfection of its structure, which in turn depended on nutritional influences during growth, both antenatal and postnatal. She found that ill formed (hypoplastic) teeth were much more common than had been supposed. For their formation the teeth require adequate supplies of calcium and phosphorus, and an ample supply of vitamin D to ensure that these are put to use. The same factors control the health of the teeth during the rest of their lives and the healing of caries.

The general object of the investigation on which this final report is based was to test the theory that nutrition is the dominant factor in determining the structure of teeth and their resistance to decay, particularly the supply of specific food elements in early life. It was impossible to investigate all nutritional influences, so the test was confined to observing the effects of adding one factor to the diet of children—vitamin D, in the form of either cod liver oil or irradiated ergosterol. The investigations were made in three similar institutions in the neighborhood of Birmingham, maintained on the cottage home system under the poor law authority. The children were recruited from the poor of Birmingham and were from 5 to 14 years of age. They were well cared for and well fed according to the recognized standards. The effect on the initiation and spread of caries of adding vitamin D and other substances to the basal diet was observed. For this purpose the children were divided into three groups, to which an addition in the diet was respectively made of treacle, olive oil or cod liver oil. The quantity varied according to age. Thus for children from 5 to 8 years of age the quantity of treacle varied from 28 to 42 Gm., of olive oil from 14 to 21 cc., and of cod liver oil from 14 to 21 cc. The incidence of carious cavities in freshly erupted teeth was 12 per cent in the cod liver oil group, which was only half that in the treacle group and two-thirds that in the olive oil group. In the deciduous teeth the protective action of the cod liver oil was not so well marked. It is claimed that this elaborate investigation shows conclusively that a relatively high vitamin D content of the food can do much to diminish the incidence of caries if given during the development of the teeth, that a beneficial effect may be obtained if the vitamin is given at a fairly late stage of development, and that even when it is given after the eruption of the teeth the onset and spread of caries is delayed.

Instruction in Protection Against Air Raids and Poison Gas Attacks

National schemes for the protection of the civil population in cases of air attack are being actively prepared by the air raids precautions department of the government in cooperation with local authorities. It is realized that the range, speed and capacity of modern aircraft enable sudden attacks to be made on a heavy scale, which would cause great damage if there should be no previous organization to deal with the situation. Although a convention exists prohibiting the use of gas in war, the possibility of its being violated, as in the case of Abyssinia, cannot be ignored. It is with regard to this that the interest of the medical profession is particularly desired. The air raids precautions department has discussed the whole position with the General Medical Council, the British Medical Association and the deans of the medical schools. A scheme has been devised to cover the instruction of graduates, undergraduates and nurses. Specially selected and trained physicians will conduct special courses under the auspices of the deans of the medical schools, the British Medical Association and the General Nursing Council. The courses will be both theoretical and practical, including experience in wearing a modern type of respirator in actual gas. Courses will consist of some six or eight attendances. The instructors will travel about the country with special equipment to give the necessary instruction at convenient centers. The courses will be open to any registered physician, dentist or nurse.

Replying to an attack by the opposition stating that precautions against air attacks were inadequate, Mr. Lloyd, under secretary to the home office, said in the house of commons that the two main classes of poison gas were the persistent and the nonpersistent. The nonpersistent would disperse naturally in a short time. The persistent were vaporized liquid and would contaminate an area and have lethal effects for several days unless steps were taken to prevent this. Prominent among the precautions were a warning system and control of public lighting. A trained service capable of finding out when gas was about and what gas it was was necessary. The decontamination of material from persistent gases should be performed. The government had sought the cooperation of the local authorities with regard to the provision of these services and the response had been satisfactory. Instruction was being given to persons who might have to undertake special duties in an emergency. Since the opening of the antigas school in April, 150 instructors had been given first-class certificates. The demand for instruction was so great that accommodations had to be doubled and another school of similar capacity erected in the northern part of England. Already all the instructors for the metropolitan police had been trained and instruction of the force was in full swing. In connection with this training the government had ordered forty mobile antigas chambers. The new respirator was 100 per cent efficient against all the gases known to the government and likely to be used in warfare. No other country was making such comprehensive provision for the protection of the civil population.

Professors Support Peace Campaign

Professors of psychology, anatomy and genetics are among the men of science who have signed the following statement on "Science and War," issued by the International Peace Campaign, London: "No scientist who reflects upon the uses to which his work is put can fail to recognize that the world is now faced with an unescapable choice—whether science shall be used for the benefit or the destruction of humanity. The International Peace Campaign has the support of thousands of inarticulate scientific workers in many countries who would like to be helping to build up a world of peace and friendship among the peoples but who, day by day, see instead the restric-

tion and evil application of their labors." The signatories include Prof. W. E. Le Gros Clark (anatomy, Oxford), Prof. J. B. S. Haldane (genetics, London), Assistant Professor J. C. Flugel (psychology, London), Julian Huxley (secretary, Zoological Society of London), Prof. V. G. Childe (prehistoric archeology, Edinburgh), Prof. H. Levy (mathematics, London) and Prof. T. H. Pear (psychology, Manchester).

PARIS

(From Our Regular Correspondent)

Aug. 29, 1936.

Maternity Insurance

Supervision of insured women workers during pregnancy and parturition and that of nurslings has always been delegated to private organizations by the social insurance authorities, who distributed the necessary funds. Up to the present the diagnosis of pregnancy has had to be made after the fourth month and an antepartum examination carried out once a month thereafter. To encourage the women to go to the antepartum clinic regularly, an additional sum was granted to the assured. Every month following delivery, the mother was obliged to bring her infant to a nursling clinic, where an allowance was granted for cow's milk if it was needed to supplement the maternal feedings or if the latter was impossible. All of these were optional on the part of the assured during the antepartum and postpartum period, the underlying idea being that in view of the extra amounts paid by the caisses, or insurance offices, the women would visit the clinics regularly during the antepartum period and bring their babies more frequently to the nursling clinics. Evidently this voluntary method was unsatisfactory, so that since Oct. 28, 1935, no allowances have been given during or after pregnancy unless the visits to antepartum and postpartum clinics are controlled by the caisses. In other words, supervision is obligatory if the women wish to receive insurance premiums during and after pregnancy.

A total of about $20 is allowed for antepartum care. The first consultation must not be made later than the fifth month and includes a radioscopy, a Wassermann test, a urinalysis and as complete a general medical examination as possible. For a normal delivery the sum of 300 francs is granted, this amount being increased in cases of dystocia according to the nature of the complication.

Dr. Dordives, in the August 15 *Siècle médical,* believes that these new regulations will be a hardship for physicians in many rural districts, because the assured will be allowed to go to certain antepartum clinics only in larger centers and thus a large number of office consultations will be lost. In addition, comparatively few physicians in smaller cities have the diagnostic resources at their disposal which the new law requires. Thus a new conflict will arise between the social insurance authorities and the medical profession, unless the antepartum and postpartum centers to be established by the caisses or insurance bureaus will be satisfied to limit their task to diagnosis and then to refer the patients to their local physicians. The antepartum centers ought not to attempt either to treat those who are now obliged to consult them during the antepartum and postpartum periods or to refer them to some free or "pseudo free" institutions. The same question arises in connection with the general diagnostic centers which the social insurance authorities have proposed to open in all parts of the country.

Operative Results in Hyperthyroidism with Cardiac Complications

Team work on the part of two cardiologists, Lian and Gaquiere, and a surgeon, Welti, in the management of severe cardiac complications of hyperthyroidism is well illustrated in a paper read at the June 3 meeting of the Académie de chirurgie of Paris. The forty-five cases were chosen from a total of 450 cases of hyperthyroidism in which Welti recently operated, so one can say that cases presenting severe cardiac complications constitute about 10 per cent of the total number. The forty-five cases can be divided clinically into (*a*) seven complete arrhythmias (auricular fibrillation) without cardiac insufficiency, (*b*) thirty-six cases of cardiac insufficiency (eleven hyposystoles, three left ventricular insufficiencies and twenty-four severe asystoles), twenty-four of the thirty-six patients in this group having a complete arrhythmia (auricular fibrillation), (*c*) one case of angina pectoris and (*d*) one case of paroxysmal tachycardia.

The authors are of the same opinion as the majority of French and American surgeons, that severe cardiac complications are more frequently encountered in cases of toxic adenoma than in exophthalmic goiter proper. They are also more frequent in men than in women: there were nine males to one female in the forty-five cases of cardiothyrosis. To obtain a satisfactory result in the latter, the operative removal should be an extensive one; hence subtotal thyroidectomy was performed in all except one patient, who refused further operation after a preliminary ligation, and three others on whom a complete thyroidectomy was carried out. None of the forty-five patients died, in spite of the severe character of the cardiac condition.

A study of their cases has convinced the authors that cardiac complications are dependent, first, on the duration and intensity of the hyperthyroidism and, secondly, on the existence of cardiac lesions either as an associated condition or independent of the hyperthyroidism. Associated cardiac lesions are uncommon, but they persist even though the symptoms of hyperthyroidism have disappeared following thyroidectomy. The more important associated lesions are arteriosclerosis, hypertension and valvular lesions. Of these, the first two appear to be of chief importance; hence one encounters cardiac complications more frequently in elderly patients, the average age being 50 years in the cases in which such associated lesions existed. In cases of toxic adenoma, the intensity of the hyperthyroidism, at the period when cardiac complications appear, is in certain cases relatively unimportant. On the other hand, in the true case of exophthalmic goiter the intensity of the hyperthyroidism is the most important factor in the genesis of the cardiac complications that appear in younger patients.

In complete arrhythmia with auricular fibrillation, and this is the most constant finding in cardiothyroses, operative intervention is followed by cure in half of the cases. Two factors influence these results: the duration of the arrhythmia and the coexistence or absence of cardiac insufficiency as well as its intensity. Return of sinusal rhythm is sometimes delayed following operation. Quinidine sulfate has proved to be of great aid in regularizing the rhythm. In cardiac insufficiency of hyperthyroid origin the subtotal operation is followed by very gratifying results.

A study of end results in thirty-three cases revealed only four failures. In three of these, improvement of the cardiac insufficiency was transitory, then the asystole recurred, and the fourth patient died of pulmonary embolism three months after operation, at a period when marked improvement had already appeared.

The results in cases of hyposystole are very much better than in patients with asystole. In the latter group of nineteen cases the result is perfect in seven, the asystole having completely disappeared and the orthoradiogram having returned to normal dimensions. In nine other patients the functional result is satisfactory but auricular fibrillation persists and the orthoradiogram remains unchanged. In a third subgroup of asystoles death occurred in three cases eighteen months, three years and five years after operation, without any amelioration of the cardiac condition.

To explain the failure of surgical treatment, one must take into consideration not only the severity of the cardiac compli-

cation but also the existence of associated cardiovascular lesions. The latter, however, are not a contraindication to operation. On the contrary, they are an indication, as shown by the authors.

A secondary total thyroidectomy is of no avail in improving the end results, and there is the additional risk of injury to the recurrent laryngeal nerve and may be followed by thyroid insufficiency. The earlier a subtotal thyroidectomy is performed, the more favorable will be the end results in cases of severe cardiac complications of hyperthyroidism.

A Series of Cases of Botulism

Five cases of botulism have been reported, three at the May 29 and two at the June 12 meeting of the Société médicale des hôpitaux of Paris. The two cases were reported May 29 by Gilbert-Dreyfus, Ravina and his associates, as following the ingestion of canned spinach and involved a man aged 41 and his daughter aged 11 years. The former had diabetes, which condition was not aggravated by the botulism but made a diagnosis difficult at the onset because of the resemblance of the clinical picture to an acidosis due to the diabetes. Guinea-pig inoculation of some of the contents of the can of spinach revealed the presence of Bacillus botulinus. The symptoms of intoxication were especially severe in the daughter. Remarkable improvement followed the use of the botulinus anatoxin and antibotulinus serum. The three additional cases, reported by Etienne May and his associates, followed the ingestion of smoked ham by all three of the patients. The first patient was given both the anatoxin and the serum, but the authors were unable to say whether or not recovery was due to this treatment. In the second case the use of strychnine and pilocarpine alone was successful, but the recession of symptoms was much slower than in the case in which the botulinus anatoxin and antibotulinus serum had been given.

BERLIN

(From Our Regular Correspondent)

Aug. 11, 1936.

Group Roentgenologic Examinations for Tuberculosis

The results of the examination of a large group of young men were reported in THE JOURNAL, Feb. 22, 1936, page 639. The *Oeffentliche Dienst* has just published the results of several other such examinations and these data are submitted as supplementary to the earlier material. The examinations in question took place at two of the work camps in central Germany. In one camp (A) 930 young men were examined, in the other camp (B) 4,143 young men. The results are given in the accompanying table.

Calcified primary foci and similar glandular tubercles are not included in the table. Among "pleural conditions" are reckoned the most unrelated types of adhesions and other anomalies; under "other miscellaneous conditions" are grouped cases of minor bronchopneumonia, insignificant cordlike scarred fields and so on.

The positive results appear relatively trivial, since in only 0.86 per cent and 0.67 per cent respectively were tuberculous conditions established that could not be detected simply by the usual auscultation and percussion of the thorax. The figures are lower than those hitherto yielded by examinations of students and of soldiers. Several examinations of students revealed 0.8 per cent to be actively tuberculous, nearly double the proportion shown in the foregoing figures. An examination of the members of a detachment of artillery (that is, of a regular army group in which the men had enlisted for long periods) in 1932 disclosed 0.56 per cent of the men actively tuberculous, the proportion of open cases being 0.28 per cent of the active. Furthermore, a roentgenologic examination of 1,369 policemen showed six open and seventeen healed cases of the disease; in other words, 1.68 per cent of clinically undetectable cases were shown to be present. It may be surmised from these last startling figures that but for the protracted unsuspected presence of carriers of contagion among their comrades many of these men might not have become infected with tuberculosis. The higher proportion for students, soldiers and policemen can be explained by the fact that the average age of the two last named groups was above 21 years, greater for the most part than that of the youths of the work camps. According to the most experienced of the group examiners it is precisely in the older age classes that one encounters the very conditions the detection of which forms the principal objective of group examinations.

The data were further augmented by another report of the roentgenologic examination of a group. In this instance the clinical examination undertaken previous to the roentgenologic had for the most part failed (in contrast to the foregoing figures for camps A and B). The youths hailed from the same region as those of camp B and were likewise candidates for the work service, but for the volunteer service in the years 1933 and 1934 (work service is today compulsory). Among a total of 1,567 men there were nine cases of active tuberculosis (0.57 per cent), three open cases of tuberculosis (0.19 per cent) and twelve cases of inactive tuberculosis (0.77 per cent). The total number of men presenting pathologic tuberculous conditions was accordingly twenty-one (1.34 per cent of the candidates).

Tuberculosis in Work Camps

	Camp A		Camp B	
	Cases	Per-centage	Cases	Per-centage
Active pulmonary tuberculosis	4	0.43	13	0.31
Cases of open tuberculosis	2	0.22	5	0.12
Inactive cases	4	0.43	15	0.36
Pleural conditions	55	5.9	76	1.80
Other miscellaneous conditions	51	5.5	23	0.56

All these data clearly demonstrate the importance of the group roentgenologic examination of youthful campers.

Research on the Alteration of Ferments in Syphilis

Professor Marchionini of the Dermatologic Clinic of Freiburg-in-Breisgau has sought to improve the diagnostic methods for syphilis by research on ferments. (Berta Ottenstein was his assistant in this work until the well known laws against non-Aryans forced her to leave her post.) The investigations have yielded noteworthy results. The alterations in the ferments were first studied as manifestations of chemical transformation within the skin of syphilitic subjects. The skin of the back of a hand of a healthy person was exposed for five minutes to the action of 5 cc. of water contained in a bell jar which covered 5 sq. cm. of skin surface. The presence of various ferments could then be detected in this cutaneous dialysate: diastase, peroxidase and, in exceptional instances, arginase. The same cutaneous experiment undertaken with syphilitic subjects elicited important variations from the ferment economy of the normal subject: an increase in diastase was noted, peroxidase disappeared completely and arginase, so seldom encountered in normal subjects, appeared with regularity. It appears therefore that the skin undergoes profound alterations during its attempt to ward off the spirochetes and their toxins. In addition, these modifications may also probably be interpreted as indicative of visceral involvement. The increased value of the arginase in particular bespeaks a process in the cutaneous areas that compensates for the loss of arginase by the liver as a result of spirochetal activity.

The ferments in the cerebrospinal fluid also were studied. In syphilitic subjects there was no characteristic alteration in the arginase content but diastase underwent a manifest decrease, even to complete disappearance; peroxidase, on the other hand, exhibited a substantial and well nigh regular increase. The observations in the cerebrospinal fluid were thus precisely the reverse of those in the cutaneous dialysate, which led Marchionini to conclude that the spirochetes and their toxins may exert an entirely different type of influence on the chemistry of the central nervous system.

Further experimentation proved that it is actually the spirochetes and their toxins that induce the foregoing extensive alterations in the chemistry of the ferments. In addition to the data on living subjects, analyses of the brains of deceased paralytic persons exhibited almost without exception a complete absence of diastase in those areas which had been most affected, notably the cortical region of the forebrain. Similarly, living spirochetes obtained from tissue juice in the cutaneous nodules of syphilitic subjects during the first months of the illness were regularly observed to destroy completely the diastase content of normal cerebrospinal fluid. All these experiments were submitted to checking by necessary controls.

These methods of determining the presence of ferments are based on sensitive reactions and they can be of service to practical diagnostics. The foregoing ferment alteration in the cutaneous dialysate is apparent in the first weeks of syphilis before the Wassermann reaction has become positive and can be demonstrated at every stage of the disease, including the late period. Further, it is more sensitive than the majority of methods for the detection of syphilis. The same thing may be said of the characteristic alteration in the cerebrospinal fluid; it too is already manifested in the earlier stages of the disease by a large proportion (as high as 70 per cent) of patients and also quite frequently in the later stages by patients in whom other methods of detecting the syphilis have failed. Marchionini emphasizes that, in addition to technical improvements in the diagnostic procedures, follow-up examinations should be instituted in a greater number of specializing clinics.

ITALY

(From Our Regular Correspondent)

July 31, 1936.

Medical Conventions

The conventions of the medical societies "Gruppo cardiologico italiano" and "Gruppo per lo studio del ricambio" have recently taken place at the medical clinic of the University of Milan. At the meeting of heart specialists, Professor Foà spoke on physiopathology of the vasosensory zones. The results of experiments carried out in this field are conclusive. The fact that arterial hypertension and hypotension originate in hyperesthesia and hypesthesia, respectively, of the carotid zones is beyond question. Many factors, among which are the conditions of the renal circulation and the postural changes of the individual, take part in the production of reflexes. The vagal and sympathetic nervous systems are also reflexogenic factors of importance. The speaker, however, does not admit the theory of Danielopolu's autotropism. Many a fact that has been proved by experiments cannot be applied to the clinical field in relation either to the diagnosis or to the treatment of certain pathologic conditions. In this connection the speaker does not agree with Professor Pande's advice of sectioning the splanchnic nerve in the treatment of arterial hypertension.

Professor Benedetti spoke on the methods proposed for quantitative evaluation of the morphology and functions of the heart. The speaker made determinations of the form, position and size of the heart of 300 men and 300 women by means of roentgenograms taken in anterior, posterior and lateral views with application of Viola's serial method. From the study of the several diameters he made an index which represents the functional cardiac value. There are types of deformations of the index to show mitral stenoses, mitral insufficiency and aortic insufficiency; there are other types of deformity in plurivalvular heart diseases, showing the existence of equilibrium between aortic and mitral insufficiency or the predominance of aortic insufficiency over mitral insufficiency and vice versa. In arterial hypertension the enlargement of the left ventricle can be seen only in the lateral view. In roentgenograms of patients suffering from exophthalmic goiter the left ventricular cord appears enlarged and the left middle arch of the roentgenogram appears prolonged or, rather, there is an increase of the left ventricle. According to the speaker, Viola's cardiac index, which consists in calculating the frequency of the pulse and of respiration after performance of ten movements of flexion of the body and a running of 150 meters in eighty seconds, is of great value in the clinical study of the functions of the heart and also in making determinations of the arterial pressure and in taking electrocardiograms. For quantitative evaluation of the functions of the heart in patients who are unable to run and climb stairs, the following method can be used: performance of rhythmic elevations of the extremities both in natural conditions and carrying certain weights. Professor Pace pointed out the danger of the test of carrying weights, which can cause serious accidents in certain patients suffering from heart diseases.

At the meeting of physicians specializing in metabolic diseases, Professor Quagliarello of the Naples University explained the transformations of the lipids in the body, the organs concerned with transformative processes and, especially, the intermediate metabolism. The speaker and his school found by extensive researches that the endocrine glands, especially the hypophysis, play an important part in the processes related to the fat metabolism and that the latter is related with the metabolism of the proteins and of the carbohydrates.

Professor Zoia spoke on the treatment of diabetes in ambulant patients. The theory that hyperglycemia originates mainly in disturbances of the islands of Langerhans still stands, although it is modified in the sense that the dysfunction of the islands of Langerhans is always associated with dysfunction of other organs. Because of the fact that the pancreas is the main pathogenic factor of diabetes mellitus, the disease can be considered as a uniglandular disturbance with pluriglandular reflexes. Satisfactory results in the treatment of the disease are obtained only by diet and by injections of insulin. The latter substance administered by mouth, and the commercial preparations known as antidiabetics, lack efficiency in the treatment of the disease. Recently the percutaneous route has been used for administration of insulin, but conclusions as to the results cannot as yet be drawn. Insulin protaminate is now in use in some countries, especially the United States, but its use has not been as yet introduced in Italy. The ambulant treatment can be used more frequently than it is actually used. Many patients are treated in this form at the clinic of Milan.

Welfare for Mothers and Children

The statistics of the national organization Opera nazionale per l'assistanza alla maternità e all'infanzia, which is concerned with the public welfare of Italian mothers and their children, show that the number of cases cared for in 1935 was 46 per cent higher than in 1934. The antepartum and postpartum care of mothers and their babies has been intensified. The number of centers for the protection and assistance of mothers and their children increased to a total number of 9,404 up to December 1935. Special courses of puériculture for physicians and midwives, as well as courses for nurses, paid for by the national organization, have been established. The number of mothers and children who were under care of the organization during

1934 and 1935 was 1,713,978. The number of treatments given during 1934 and 1935 was 3,686,220. The donations given to the organization in 1935 amounted to more than a million dollars.

Number of Workers in Medicine

Recent statistical studies have shown that the number of persons practicing medicine or working in fields connected with medicine and its branches in Italy is as follows: 35,651 physicians, 12,912 pharmacists, 4,174 veterinarians, 15,982 midwives and 6,909 nurses. Of the total number of physicians, 9,390 are municipal physicians. From a comparison of the present statistics with those made in 1927 it is seen that the number of physicians increased by 5,567, that of pharmacists by 359 and that of veterinarians by 559. The number of midwives is almost unchanged.

NETHERLANDS

(From Our Regular Correspondent)

Aug. 5, 1936.

Cataract and Dinitrophenol

Van der Hoeve and Polak Daniels have published a warning in the *Nederlandsch tijdschrift voor geneeskunde* against the dangers of dinitrophenol. The authors describe a case, observed by them, of cataracta matura of both eyes resulting from absorption of some 40 Gm. of dinitrophenol. The drug had been absorbed in the course of two distinct periods and at no time had the normally prescribed daily dosage been exceeded. From April 1934 to June 1934 the patient swallowed a capsule of 100 mg. three times a day, a total for the period of 22.5 Gm.; then from September 1934 to January 1935 an additional total of 18 Gm. was absorbed. The initial symptoms appeared in June 1935, several months after the patient had ceased to use the drug. There was no other possible explanation for the development of the cataract.

Tropical Diseases in the Indies

Speaking at the University of Amsterdam, Dr. Brug discussed the present state of tropical pathology in the Dutch East Indies. He pointed out that few of the tropical maladies encountered in the Indies are autochthonous and that an understanding of the reasons for this is necessary if all possible avenues by which the diseases might be introduced into these colonies are to be brought under surveillance. The explanations are complex. Certain tropical diseases could never be imported into the Indies—African sleeping sickness (Congo trypanosomiasis) is an example in point. This disease is transmitted exclusively by the tsetse fly and this insect as well as the disease are not to be found outside Africa.

Schistosomiasis is found in Asia, Africa and America but not in the Dutch East Indies or Australia, because the species of snails that act as host is lacking. Certain other verminous diseases are unable to gain a foothold in the Indies because the living habits of the people protect them against such infection. Dracontiasis (the disease caused by Dracunculus medinensis) is found only among populations who drink polluted and stagnant water, whereas the inhabitants of the Dutch colonies avoid such contamination. Clonorchis and the Paragonismus (or lung fluke) attack only eaters of raw or nearly raw fish, but uncooked fish is not eaten in the Dutch Indies. Yellow fever is not found there; the lightly clad population is not infected by fleas. To date Loa loa and Onchocerca have not been imported into the Indies. The reasons for the absence of kala-azar and yellow fever are not known.

The precise manner in which kala-azar is transmitted is not yet understood, but this cannot be said of yellow fever. The latter disease prevails over a great part of Africa but has not yet spread to the East Coast. The infected mosquitoes, however, can be transported great distances by the airplane.

Marriages

FRANKLIN STAFFORD WEARN, New York, to Miss Mildred Field King of Jackson Heights, Long Island, N. Y., June 27.

ERNEST CARL MARGARET, Glenwood, Iowa, to Miss Violet E. Hansen of Oakland, Calif., in Council Bluffs, Iowa, June 3.

LAWRENCE N. WATHIER, Atkinson, Ill., to Miss Madeline Goering of Walcott, Iowa, in Davenport, Iowa, June 6.

RICHARD HARPER WHITAKER, Kernersville, N. C., to Miss Martha Louise Hubbard of Marshallton, Pa., June 17.

SHERMAN S. GARRETT, Champaign, Ill., to Miss Virginia Hailey of Kansas City, Mo., Carlinville, in June.

HENRY FREDERICK STEPHENS to Miss Mary Emma Van Benschoten, both of Providence, R. I., July 7.

JOHN CRAWFORD HOLMAN JR., Franklin, Texas, to Miss Margaret McKinzie of New Orleans, June 20.

JOHN F. STREKER to Miss Winifred Smith, both of Providence, R. I., in Fall River, Mass., June 20.

GEORGE GIBSON MOORE, McColl, S. C., to Miss Bonner Lipscomb of Ninety-Six, at Clinton, in July.

CHESTER E. HABERLIN, Stratford, Conn., to Miss Marian Kathryn Page of Bridgeport, June 11.

ROGER F. SONDAG, East St. Louis, Ill., to Miss Mary Jo Gualdoni of Murphysboro, June 30.

FRANCIS KEITH BRADFORD, Chicago, to Miss Margaret Anne Bowles of Richmond, Va., recently.

GEORGE L. JONES, Wanamaker, Ind., to Miss Martha Elizabeth Piel of Indianapolis, June 20.

LOREN LENNOTH LOVE, Valier, Ill., to Miss Thedis Wente of Johnston City, in Benton, recently.

JAMES A. ROBERTSON, Brooklyn, to Miss Cecile Florence Burns of Ossining, N. Y., June 27.

JOHN BERNARD CHRISTIE, Champaign, Ill., to Miss Marie Anna Sturdyvin in Peoria, in July.

LELAND MANN JOHNSTON to DR. HELEN MOORE PRESLEY, both of Nashville, Tenn., June 27.

RALPH KENNETH SHIELDS, Bethlehem, Pa., to Miss Mildred Mary Lyle of Columbia, June 20.

PHILIP FREDERIC SCHNEIDER to Miss Kathryn Ann Lantz, both of Evanston, Ill., June 17.

JOSEPH A. ROBINSON to Miss Elizabeth Arnold White, both of Bluefield, W. Va., recently.

FRED GRANT PEGG to Miss Pauline Amanda Sink, both of Winston-Salem, N. C., July 4.

SETH M. B. SMITH, Wausau, Wis., to Mrs. Elsa Kircher of Hollywood, Calif., June 22.

EDMOND L. RICE, Soochow, Kiangsu, China, to Miss Mary O. Holler of Shanghai, June 29.

OMER SECKINGER GROSS, Vidalia, Ga., to Miss Bill Jones of Ludowici, in Alma, July 12.

ROBERT EDWARD TIMBERLAKE to Mrs. Johnnie R. Smith, both of Richmond, Va., June 29.

ROBERT FISKE WARREN to Miss Lucy Marie Sinclaire, both of Brooklyn, July 2.

JOSEPH P. WILD, Hancock, Wis., to Miss Cecelia Wolf of Kaukauna, June 20.

OLIVER M. LAYTON to Miss Ruth Murphy, both of Fond du Lac, Wis., recently.

JOHN A. THRANOW to Miss Josephine Price, both of Milwaukee, July 11.

GUSTAVE F. WEBER to Miss Shirley Scales, both of Marshall, Texas, recently.

WILLARD W. WILD, North Charleston, S. C., to Miss Christine Daniel, June 6.

GEORGE M. WYATT to Miss Dorothy Mattern, both of Cleveland, in July.

EDWARD J. SMITH to Mrs. Susie McCranie, both of Hahira, Ga., recently.

AUGUST FINCKE to Miss Emma M. Wagner, both of Brooklyn, June 30.

FREDERICK STENN to Miss Harriett Stricker, both of Chicago, August 16.

HUGH J. HALL, Providence, R. I., to Miss Helen Thompson, June 28.

Deaths

Henry Parker Newman, professor of gynecology, emeritus, at the University of Illinois College of Medicine, Chicago; died, September 21, of coronary occlusion, at his home in San Diego, Calif., aged 82. Dr. Newman was born in Washington, N. H., Dec. 2, 1853. He obtained his preliminary education at the New London (N. H.) Literary and Scientific Institution and later attended Dartmouth College. In 1878 he received the medical degree from the Detroit Medical College, and later, for two years, studied at universities in Bonn, Leipzig and Strassburg. In 1880 Dr. Newman located in Chicago. He became professor of obstetrics and clinical gynecology at the College of Physicians and Surgeons of Chicago, of which institution he was also treasurer and member of the board of directors. At one time he was professor and emeritus professor of gynecology at the Chicago Policlinic and one of the founders, president and professor of gynecology, Post-Graduate Medical School and Hospital of Chicago and was president of the laboratory of experimental research while it was part of that institution. From 1894 to 1904 he was treasurer, chairman of the Section on Obstetrics and Diseases of Women from 1900 to 1901, and a member of the House of Delegates from 1916 to 1918 of the American Medical Association. He was an Affiliate Fellow of the American Medical Association, at one time vice president of the Chicago Gynecological Society, and one of the founders and a fellow of the American College of Surgeons. He was a member of the Gorgas Memorial Institute of Preventive Medicine, Washington, D. C., a founder of the Congrès Périodique International de Gynaecologie et d'Obstétrique, and in 1890 a delegate to the Tenth International Medical Congress in Berlin. He was consulting surgeon and gynecologist to the San Diego County and Mercy hospitals, San Diego, and the Scripps Memorial Hospital and Clinic, La Jolla. He established, and was president and surgeon-in-chief of the Marion Sims Sanitarium; was formerly on the staffs of the Chicago Post Graduate, St. Anthony's, Chicago Maternity, West Side and St. Elizabeth's hospitals, Chicago. In 1894 he was awarded the honorary A.M. degree by Dartmouth College.

Francis Joseph Quinlan, Amawalk, N. Y.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1878; member of the Medical Society of the State of New York; formerly emeritus professor of laryngology and rhinology at the Fordham University School of Medicine, New York, and the New York Polyclinic Medical School and Hospital; at one time on the staffs of the City Hospital, St. Vincent's Hospital and the New York Foundling Hospital, New York, and the Jamaica (N. Y.) Hospital; aged 83; died, July 24, of diabetes mellitus and arteriosclerotic heart disease.

Samuel Robert Cunningham, Oklahoma City; Medical College of Indiana, Indianapolis, 1899; professor of orthopedic surgery at the University of Oklahoma School of Medicine; member of the Oklahoma State Medical Association, American Orthopedic Association and the Clinical Orthopedic Society; fellow of the American College of Surgeons; aged 64; chief of the orthopedic staff, State University Hospital and Crippled Children's Hospital; consulting surgeon and head of the orthopedic department, St. Anthony Hospital, where he died, September 7.

Charles B. Finefrock, Port Clinton, Ohio; Cleveland College of Physicians and Surgeons, Medical Department of the University of Wooster, 1895; member of the Ohio State Medical Association; past president of the Ottawa County Medical Society; county health commissioner from 1920 to 1936; past president of the Northwestern Ohio Health Commissioners' Association; at one time member of the school board and county coroner; aged 64; died suddenly, July 1, of coronary thrombosis.

Joseph Jeremiah Kane ✠ Binghamton, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1903; past president of the Broome County Medical Society; fellow of the American College of Surgeons; member of the board of education, and past president of the city board of health; on the staff of the Binghamton City Hospital; past president of the Broome County Tuberculosis Hospital, Chenango Bridge; aged 57; died, July 18, of chronic myocarditis and cerebral hemorrhage.

Laurence Stephen Otell ✠ Washington, D. C.; Johns Hopkins University School of Medicine, Baltimore, 1925; instructor, 1928-1930, assistant professor, 1930-1933, and associate professor of radiology, Georgetown University School of Medicine, 1933-1936; on the staffs of the Georgetown University Hospital and the Gallinger Municipal Hospital; aged 39; died, July 27, at his home in Bethesda, Md., of leukemia.

John Ryan Devereux, Chevy Chase, Md.; University of Pennsylvania Department of Medicine, Philadelphia, 1892; veteran of the Spanish-American and World wars; at one time served as a captain in the medical corps of the U. S. Army and was connected with the U. S. Public Health Service; formerly instructor in medicine and clinical professor of medicine, Georgetown University School of Medicine, Washington, D. C.; aged 68; died, July 2, of cerebral hemorrhage.

Leonard Pearsons Sprague ✠ Chateaugay, N. Y.; University of Vermont College of Medicine, Burlington, 1906; past president of the Franklin County Medical Society; served during the World War; for many years president of the board of education, and health officer of the village and towns of Chateaugay and Burke; member of the staff of the Alice Hyde Hospital, Malone; aged 56; died, July 14, of cerebral hemorrhage.

George Thornhill Harris, Madison Heights, Va.; Kentucky School of Medicine, Louisville, 1898; member of the Medical Society of Virginia; for many years a member of the school board, and the county board of health; on the staff of the State Colony for Epileptics and Feebleminded, Colony; aged 60; died suddenly, July 16, of angina pectoris.

Percival J. Herman, Selinsgrove, Pa.; Cincinnati College of Medicine and Surgery, 1876; member of the Medical Society of the State of Pennsylvania; past president and secretary of the Snyder County Medical Society; bank president; formerly county coroner and member of the state legislature; aged 84; died, July 15, of carcinoma of the prostate.

Jacob Polevski ✠ Newark, N. J.; University and Bellevue Hospital Medical College, 1909; research associate in cardiology at the University of Pennsylvania Graduate School of Medicine, Philadelphia; attending physician and cardiologist to the Newark Beth Israel Hospital; aged 52; died, July 27, in the Johns Hopkins Hospital, Baltimore.

Dean Samuel Harrison, Yorkville, N. Y.; Albany Medical College, 1899; member of the Medical Society of the State of New York; formerly mayor, and school and village health officer of New York Mills; member of the staff of the Faxton Hospital, Utica; aged 61; died, July 25, of coronary occlusion and arteriosclerosis.

Henry Theodore Nippert ✠ St. Paul; Miami Medical College, Cincinnati, 1891; president of the Ramsey County Medical Society in 1916; formerly clinical instructor in medicine, University of Minnesota Medical School, Minneapolis; on the staff of the Ancker Hospital from 1903 to 1919; aged 68; was drowned, July 4.

Eugene Lindauer, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1898; associate in neurology at the University of Pennsylvania Graduate School of Medicine; on the staffs of the Graduate and Philadelphia General hospitals; aged 64; died, July 28, of coronary occlusion.

Jerome Milton Keys, Omaha; Eclectic Medical Institute, Cincinnati, 1882; at one time professor of principles and practice of medicine and dean of the faculty, Nebraska Medical College, Lincoln; aged 85; died, July 9, in the Lutheran Hospital, of hypostatic pneumonia and cerebral arteriosclerosis.

Louis Martin Kalajian, Cranston, R. I.; Boston University School of Medicine, 1936; aged 28; intern at the Mercy Hospital, Wilkes Barre, Pa., where he died, August 21, of rheumatic heart disease, acute pulmonary edema and bilateral pneumonia.

Austin A. Swope, Crawfordsville, Ind.; Medical College of Indiana, Indianapolis, 1898; member of the Indiana State Medical Association; on the staff of the Culver Hospital; aged 68; died, July 17, of cerebral embolism and gastro-enteritis.

Clarence Alexander Hamill, Ligonier, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1908; member of the school board; aged 55; died, July 19, in the Latrobe (Pa.) Hospital, of acute myocarditis and perforated gastric ulcer.

Carl Albin Lofgren, Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; aged 67; died, July 12, of diabetes mellitus.

Robert Wesley Lynn, Lethbridge, Alta., Canada; University of Toronto Faculty of Medicine, 1909; aged 52; died, July 8, as the result of an automobile accident.

Joseph S. Thrailkill, Wood River, Ill.; American Medical College, St. Louis, 1883; aged 75; died, June 30, of arteriosclerosis.

Correspondence

NATURE OF DOG BITES

To the Editor:—In the interest of accuracy, a revision of Dr. Morris's revision of Mr. Terhune's statement (THE JOURNAL, September 5, p. 809) seems necessary. "Canines give a vigorous shake to a bite" is altogether too broad a generalization to apply to a genus purposely bred to such wide variations, trained to immensely different modes of action. The quoted statement is true of the terrier breeds, which, seizing small animals such as rats and rabbits, give a shake to break the neck. In contrast, breeds such as the collie and wolfhound, equipped with long shearing jaws, give a swift slash and leap back instantly to escape the enemy's *riposte*. Then consider the retriever breeds, trained to seize their prey with the utmost gentleness. I have never known one of this breed, even under extreme provocation, to give a human being a bite that could be called more than a reproachful nip. And again, there is the bulldog, trained to close his jaws on a victim and keep them closed with the grim implacability of a steel clamp. The bites of lap-dogs, with their small mouths and sharp teeth, resemble cat bites.

Besides the wound variation due to such instinctive modes of attack, one has to consider further variations due to each individual animal's personality or temperament. This factor probably varies more widely in dogs than in any other animal except man. The only conclusion is: Dog bites are as you find them, which will be in great variety, each indicating its own best mode of treatment.

JOHN G. HANNA, Dunedin, Fla.

"SERUM TREATMENT OF ACUTE POLIOMYELITIS"

To the Editor:—It has been generally overlooked that the advocacy of convalescent serum in therapy was probably based on a misconception. Because convalescent serum neutralized poliomyelitis virus in vitro, it was assumed that it would do so likewise in patients, without considering the time interval and the probable fixation of virus in the nervous tissue. In practically every region where poliomyelitis prevails, the disease was first recognized after paralysis had developed, and only later was it realized that diagnosis was possible during the preparalytic phase and that there was also a nonparalytic type. When serum treatment was instituted the results seemed almost uniformly favorable, since the ratio of the preparalytic to the nonparalytic could not be determined prior to treatment, nor could there be reliable knowledge of the incidence of unreported illness in the community that might have been due to unrecognized nonparalytic poliomyelitis.

Harmon's review, to which reference is made in the editorial on serum treatment of acute poliomyelitis (THE JOURNAL, August 8, p. 432), can hardly be held as giving support to serum therapy except on clinical impression, and his final paragraph reads, in part, like an uncritical anticlimax to an exhaustive analysis. Jensen states in his report that it was the first time that serum was used in Denmark in preparalytic cases; prior to 1933 only paralytic cases were reported. The recent review published by the Health Section of the League of Nations (R. E. 180, No. 10-12 [Oct.-Dec.] 1935) in commenting on Jensen's report points out that the patients treated early with such apparent success must have included not only severe cases but also all the mild cases, which would in any event have escaped paralysis; whereas, the cases treated later, since the attack lasted longer, included the severe cases and, therefore, would naturally show a higher percentage of paralysis.

But aside from considerations of the literature, my own experience has led me to doubt the efficacy of serum. In 1924 I had an opportunity to observe personally in the Syracuse outbreak (THE JOURNAL, Aug. 11, 1928, p. 394; *Am. J. Dis. Child.* **41**:829 [April] 1931) a series of forty-six preparalytic cases, thirty-two of which were treated with convalescent serum and fourteen with horse serum possessing no antiviral properties. In the first group, 84 per cent escaped paralysis; in the second, 64 per cent. Analyzed statistically, it can be shown that there is no significant difference between the results in these two groups. Yet Kellogg (THE JOURNAL, Dec. 21, 1929, p. 1927) and others in referring to this observation inferred that both serums were effective, without inquiring into the natural history of the disease in such cases. Harmon has since collected the statistics on 531 untreated patients with preparalytic poliomyelitis and found that 380, or 71.5 per cent, never had paralysis at any time, and he points out that the outcome in patients treated in the preparalytic stage does not differ from the average of untreated patients.

Following Park's study in 1931, my associates and I began venturing to treat early cases of poliomyelitis without serum. In the 1935 outbreak in Syracuse, there were thirty local cases and five cases imported from neighboring areas. Of the thirty-five cases, twelve were reported after paralysis had developed and twenty-three were reported early in the disease without any muscle weakness. I was able to observe these cases carefully and had all but six in my service in the City Hospital. Omitting three cases in which serum was administered and two treated by spinal drainage, eighteen are left that were treated expectantly. Slight muscle weakness developed in two of these and sixteen of the patients remained nonparalytic.

It may be that a final decision cannot be made at this time. A number of recent papers have emphasized the value of transfusion in poliomyelitis. I have given transfusion in severe progressing cases and have seen apparent sudden cessation of the advancing paralysis and definite clinical improvement, but I have been inclined to attribute the improvement to the general and nutritional effects of the transfusion rather than to specific antibodies that the blood might have contained.

The chief objection to recommendation of serum treatment is that it makes it almost impossible to carry out observations on the natural history of the disease during epidemics. When I asked some Swedish pediatricians in 1930 why they had not obtained control series, they replied that they had not dared to let children with early poliomyelitis go without serum so long as it was considered valuable in therapy. This attitude likewise tends to induce anguish in parents whose children do not receive this treatment.

Finally, I should like to submit that the term "preparalytic" is inaccurate, in the sense that it is ordinarily used, as applied to cases in which there is no muscle involvement when first recognized. It would be far more accurate to speak of them as incipient poliomyelitis cases, denoting that they might remain nonparalytic or terminate in muscle weakness or paralysis.

A. CLEMENT SILVERMAN, M.D., Syracuse, N. Y.

DENTAL NOMENCLATURE

To the Editor:—The first book to be reviewed in THE JOURNAL, August 15, page 527, is Dental Roentgenology, by Dr. LeRoy M. Ennis, the second edition. It is well reviewed with the exception of the last sentence, which reads:

> As in the first edition, the author clings to certain terms that are obsolete and should be changed; he uses the term premolar instead of bicuspid and refers to mandibular and maxillary molars instead of upper and lower molars.

Most of the few dentists who read THE JOURNAL will merely pass this by and remark inwardly that nothing can be done about it, with a smile, but, for the medical man who wishes to inform himself intelligently on anatomic matters, let him not

be misled by the statement quoted. He will find in a certain little book, Dental Anatomical Terminology, by L. Pierce Anthony for the Committee on Nomenclature of the American Dental Association, and published by the committee in 1930, that premolar, mandibular and maxillary are the terms of choice, and not bicuspid, upper and lower. Some one other than Dr. Ennis seems to be out of date.

LAWRENCE CURTIS, D.D.S., M.D., Philadelphia.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

HYPERPYREXIA IN TABETIC FORM OF DEMENTIA PARALYTICA

To the Editor:—In the treatment of the tabetic form of dementia paralytica when should hyperpyrexia be attempted and what is the best recognized method? Where can I find literature on this subject? Kindly omit name and address.

M.D., Pennsylvania.

ANSWER.—The earlier a case of the tabetic form of dementia paralytica is treated with hyperpyrexia the better are the chances for a recovery. Hyperpyrexia will in certain cases arrest the disease and produce a mental remission in the patient. This treatment cannot, of course, restore nerve tissues that have already been destroyed, though it may decrease the inflammatory infiltrations that are caused by the disease. It may also kill some or many of the spirochetes present in the tissues of the central nervous system if the fever is high enough and sustained long enough. To be effective in this sense, a bout of fever should be sustained for at least eight hours above 103.5 F. and above 105.8 for two of these eight hours. Between ten and twenty or more bouts of fever should be given each patient.

There are many methods in use for producing artificial fever, and opinions differ greatly as to what modality should be employed. The oldest methods are those which use malaria, typhoid vaccine and injections of foreign proteins and chemicals. Since 1929 a number of physical agents have been recommended by various authors for the production of therapeutic fever in man. Among these are hot baths and external and internal heating devices. Hot baths are used only by a comparatively small group of physicians because they are reported to be inherently more dangerous than the other methods. External heat in the form of electric blankets, electric light cabinets, radiant heat cabinets and air conditioned cabinets has been recommended by certain groups of investigators. Other workers prefer the use of penetrating heat produced by diathermic currents, so-called short radio waves and electromagnetic induction. It is quite impossible, therefore, to state that any method is a recognized method for producing artificial fever. The entire subject is at present in a flux. Changes in the methods of treatment are being advocated constantly. The literature on this subject is scattered throughout the medical journals of the world and no comprehensive book has as yet been written on the subject. The best way to become acquainted with the writings of hundreds of men who are interested in the subject is to consult the *Cumulative Index Medicus.*

Hyperpyrexia is at present a hospital procedure and should not be attempted ambulantly or in the office of a physician. The successful treatment of a patient with artificial fever depends more on the skill of the physician than on the use of any specific drug, disease or machine. It is much more important, therefore, that a physician be well schooled in his particular method for producing elevated temperatures than that a certain definite method of inducing fever should be chosen. Many of the machines now on the market are unjustly extolled by their manufacturers. Certain machines have been approved by the Council on Physical Therapy and will produce fever efficiently. Others leave much to be desired in their action and some are dangerous. It is therefore much more a question of the skill and experience of the physician who uses artificial fever therapy than a question of the modality he chooses to employ.

"GLEET"

To the Editor:—A dentist, married one year, developed a urethritis three and one-half months ago. There is no history of outside sexual contacts. No contraceptives are being used by either husband or wife. The urethritis was rather mild, the discharge being grayish white and mucopurulent. This lasted about three weeks and subsided. Repeated examinations failed to show gonococci. Now after three and one-half months the walls of the terminal part of the anterior urethra as well as the meatus are often glued together; there is a slight amount of discharge (small drop) in the morning. The urine is not cloudy grossly even in the first glass but always shows clumps or flakes of pus floating in the urine. The second glass is always entirely clear. Except for the anterior urethritis, the examination of the genito-urinary system is negative. The patient is in the best of health, without evidence of tuberculosis anywhere, including the genital apparatus, and the prostate feels normal. My diagnosis was nonspecific urethritis. My treatment consisted of occasional injection of mild protein silver, 10 per cent, occasionally potassium permanganate 1: 5,000, 3 per cent resorcinol several times, and on two occasions diluted hydrogen peroxide followed by mercuric oxycyanide 1: 800. The chronic urethritis still persists. Kindly diagnose and outline treatment. LOUIS N. RUDIN, M.D., Orr, Minn.

ANSWER.—The patient's problem concerns itself with the determination of the cause of the morning drop and the glued meatus. This condition is sometimes called "gleet."

One of the common causes of gleet is the presence of infection in the prostate gland or seminal vesicles or both. Therefore a careful examination of the prostate should be made by rectal examination and the prostate and vesicle carefully massaged and the fluid examined for the presence of pus. If pus is found, the fluid should be stained with methylene blue and a Gram stain made to identify the organisms present. It probably will be advisable to make cultures of the fluid. If possible, a bouillon filtrate should be prepared and the patient inoculated with it. Heat by rectum, sitz baths and massage are in order, should these organs be involved.

Careful exploitation of the urethra should be made with acorn bougies to ascertain the presence of granulations or strictures. Should they be found, sounds should be passed at weekly intervals and the urethra should be massaged on the sound. This should be followed by the injection of strong protein silver 0.5 per cent, or urethral irrigation may be used with potassium permanganate in the strength of 1: 4,500.

In rare instances the discharge may be due to a small meatus. If this is the case a meatotomy should be done.

Finally, if all these are negative, examination of the urethra with the endoscope is advisable in order to see whether infection in the glands of Littré or in the Locunae of Morgagni is present. This should be treated by fulguration with the high frequency spark through the endoscope.

TOXICITY OF OSMALITE TERMITE REPELLANT

To the Editor:—There is a preparation named Osmalite used in the preservation of wood. I understand that its composition is dinitrophenol, sodium fluoride, potassium bichromate and gum arabic. This preparation penetrates into rubber gloves, and the skin of the hands is stained a deep yellow. It is applied as a paste with a brush to poles, and a week ago one of the workers came in with a folliculitis, which, I felt, might be traced to this compound. Have you any record of industrial poisoning due to this specific compound used in the manner described?

M.D., Michigan.

ANSWER.—Osmalite is a fairly new wood preservative, so that full knowledge of its toxic properties is not available. Its chief use is said to be as a repellant for termites. It is believed to contain the following constituents in approximately the proportions shown: dinitrophenol 14 per cent, sodium fluoride 78 per cent, potassium bichromate 3 per cent, gum arabic (acacia) 5 per cent. This substance is mixed into a paste, approximately one pound of water being used for two pounds of the powder. This paste is destructive for protective gloves so that contact with the skin is a reasonable expectancy. In addition to local action, systemic involvement conceivably may arise from skin absorption (chiefly of the dinitrophenol, which readily passes through the skin), and possibly through carrying particles of the chemical mixture from the hands to the mouth in eating or smoking.

Each of the ingredients thought to be present has been the source of skin disease. In addition, the dinitrophenol in small quantities is regarded as highly toxic in that well defined systemic disorders may be produced. These have been well described in THE JOURNAL during recent months in connection with the use of dinitrophenol in weight reduction. The action of this substance as a skin irritant is quite like that of trinitrophenol (picric acid). Sodium fluoride may be accepted as relatively unimportant as a skin irritant, but cases have been described. This substance is currently attracting attention as a source of damage to the teeth. Even in the low percentage

present, potassium bichromate may be injurious to the skin, particularly if the integument should be broken. Dermatoses from gum arabic are probably allergic in nature.

A folliculitis from osmalite is not denied as a possibility, but it is felt that a direct contact chemical dermatitis is more likely. No known published records have reported a dermatitis from this wood preservative, but casual inquiry of users indicates the occurrence of skin disturbances.

In the absence of extensive toxicologic data it becomes necessary to regard this chemical mixture (because of extensive information about its constituents) as dangerous if in fact it is brought directly in contact with the worker's body.

INSOMNIA IN DIABETES

To the Editor:—An intelligent white man, aged 29, has had diabetes for the past five years. He complains that for the past three months he has not been able to sleep except for intervals of from fifteen to thirty minutes. He says that he is tired but is never sleepy. I have given him practically all the recognized hypnotics from bromides, in massive doses, to pentobarbital sodium, but they do not seem to be effective in producing sleep. At the present time his diabetes is being treated with 60 units of insulin and a diet containing 125 Gm. of carbohydrate. His blood sugar level seems to be lowered under this treatment, being 200 mg. at the present date. His urine is acetone and sugar free. He maintains his weight at between 140 and 146 pounds (63.5-66 Kg.). His blood pressure is 130 systolic, 80 diastolic. His pulse rate varies from 100 to 120 and the respiration rate is 18. During the past two months he has had a rapid pulse of from 100 to 120 per minute even at rest. At times he gets attacks of palpitation of the heart, which do not last very long. His past medical history is practically negative. There are no complaints referable to the genito-urinary or gastro-intestinal tracts or other symptoms, except as stated. At times he breaks out with an urticaria, which he thinks may be due to the insulin, since it often occurs after he injects the insulin prescribed. What is the apparent cause for his sleeplessness and how can it be treated? Can insulin in large doses be responsible in any way? Can insulin cause an urticarial reaction? Please omit name.

M.D., Pennsylvania.

ANSWER.—Diabetic patients seldom have insomnia. Of course there is the possibility that the patient may develop a low blood sugar during the night even though the blood sugar reported is 200 mg. This should be followed up more closely. Insulin does not cause insomnia without accompanying symptoms, such as those resulting from hypoglycemia. Therefore, in this patient one must look for other reasons. By chance is there hyperthyroidism? Does the patient take other drugs? Is the Wassermann reaction negative? A lumbar puncture might be desirable and a nervous cause should be sought. Is the patient neurotic? Does he earn his own living?

As for urticaria, it is true that allergic reactions do develop in patients after administration of insulin, but as a rule these disappear within a few weeks of the beginning of treatment. When they once disappear, they seldom recur.

REMOVAL OF PIGMENT FROM SKIN

To the Editor:—In the March issue of *Hygeia* there is an article entitled "The Blue Man," written by Arthur W. Stillians. He states that it is possible to remove silver deposits from the skin. The son of a prominent man in this city has a permanent "black eye." This dates to three years ago when the doctor who was in this office before me attempted to force silver nitrate through the tear duct, causing the silver nitrate to go into the tissues and turn black. This has caused a permanent pigmentation of the skin, about which the family is very anxious. Therefore I am writing to you to find out the technic of the method described in the aforementioned article. Just which photographic reducing fluid is used? What strength is to be used? How is it sterilized? Any other pointers in the technic, such as depth of injection and advisability of periods between injections, will be appreciated. I should like to be able to help this child.

M.D., New Hampshire.

ANSWER.—The reducing fluid used for removal of silver from the skin is one composed of a solution of potassium ferricyanide and sodium thiosulfate in water. One per cent of the ferricyanide and 6 per cent sodium thiosulfate were found to be as efficacious as any other percentage, though other strengths will do the work. A 2 per cent solution of potassium ferricyanide is prepared (10 cc. is a convenient quantity) and a 12 per cent solution of sodium thiosulfate. Equal quantities of these two are drawn into the syringe just before injecting. If mixed and allowed to stand, the solution oxidizes and becomes inert. As soon as the mixture is made, it is injected intradermally through a fine platinum needle, causing a wheal. When this subsides, after several days, a white spot will be seen where the silver has been removed.

The injection causes a sharp stinging sensation. Local anesthesia may be used if epinephrine is omitted, for it delays drainage of the silver solution into the lymphatic vessels and the silver is redeposited. Nerve blocking can be accomplished by injecting the anesthetic into the infra-orbital foramen, though additional subcutaneous injections will be needed about the internal canthus. Unfortunately the skin of the lower lid, which is most often stained by silver, is the hardest part of the skin to treat because it is so thin. Great care must be exercised to place the fluid as superficially as possible. The needle should be very fine, and a locking syringe is of great advantage when many injections are to be made. If the solution is made in sterile distilled water in sterile glassware and handled with surgical precautions, the fluid needs no sterilization. Potassium ferricyanide is antiseptic, and attempts to sterilize will destroy the value of the solution.

There is no danger of poisoning from the use of potassium ferricyanide. So little can be introduced even by the fastest worker, and it is destroyed so rapidly by oxidation, that any harm to a human being from this source is unlikely.

It is advisable to allow the reaction in one area to subside somewhat before treating a contiguous area, though no harm to the skin has resulted from many thousands of such injections.

BILATERAL CAROTID ANEURYSM

To the Editor:—Is there any treatment for bilateral carotid aneurysm? One side is 1½ by 1 inch, the other side 1 by three-fourths inch. They do not seem to have pedicles. If there is a treatment, please give prognosis. Kindly omit name and adress.

M.D., Wyoming.

ANSWER.—Treatment for bilateral aneurysm should be limited in adults preferably to open operation with obliteration of the sac and reconstruction of the lumen of the common carotid artery, or end to end suture if feasible. In young persons and occasionally in adults it may be found desirable or necessary under certain conditions to ligate the common carotid artery above and below the aneurysm. In a large percentage of adults this will lead to cerebral anemia and perhaps hemiplegia and symptoms of mental degeneration.

Before operation an effort should be made to develop collateral circulation by digital compression of the artery proximal to the aneurysm, and only one side should be operated on at a time. The metallic band as used by Halsted, Matas and Allen for either complete or partial occlusion of the artery has many advantages over ligatures. The lumen of the artery may be occluded in one or more stages as collateral circulation develops. It may be removed after partial or complete occlusion if cerebral symptoms develop.

Local anesthesia should be used because of the danger of cerebral anemia.

The prognosis without operation is poor, although cases of spontaneous thrombosis and cure of a common carotid aneurysm have been reported. There is considerable danger of a propagating thrombosis after ligation and but little after use of the metallic band.

In old or bad risk patients, no treatment other than rest and avoidance of effort should be attempted.

IRRITATION OF EYES FROM LACQUER SPRAY

To the Editor:—I am practicing in a town where a radio cabinet factory is located and have had some patients consult me on the chronic irritation of the eyes due to the lacquer spray used in cabinet manufacture. I have consulted the literature on the subject and have not been able to find a definite treatment. I have used many of the commoner eye lotions to no avail and shall be grateful if you will kindly advise me on the subject.

M.D., Indiana.

ANSWER.—The coating materials customarily applied to radio cabinets are not dissimilar to those widely used in other industries, including furniture and piano manufacture. The many possible lacquer solvents and thinners include toluene, xylene, benzene, petroleum fractions, divers alcohols and acetates. All are potential eye irritants. The direct entry of any of the fluids into the eye, such as from splashing, will inevitably lead to an acute conjunctivitis. More often the eye disorders are due solely to day by day exposure to vapors and mists created in the normal course of spray coating. This form of conjunctivitis is not severe but commonly will persist as long as exposure is continued, regardless of treatment. There is no specific treatment, and relief is to be sought in preventive measures. Properly designed spray booths protect the workman against this form of injury. Goggles are available with soft rubber edges which, by fitting closely against the skin about the eyes, avoid the entry of irritants. Various types of hoods likewise offer some degree of protection.

In the absence of secondary infection, this form of conjunctivitis may be expected to disappear without or with treatment soon after exposure is eliminated. In many Indiana manufacturing cities, large numbers of Kentucky mountaineers are employed. In this class of workers trachoma has been encountered, and this constitutes somewhat of an industrial hazard in that state. Until ruled out, trachoma should be suspected in the present situation. Remotely the possibility exists that methanol (wood alcohol) may be used in radio cabinet coatings. This substance, if present, obviously provides a greater threat to the eyes of exposed workmen than any usual constituent of paints, lacquers, enamels or their thinners.

CAUSES OF DEATH

To the Editor:—A man, aged 48, employed by a local distributing company, was involved in an automobile accident February 29 near an adjoining city. As a result of this accident he suffered what were considered several minor contusions about the body. He was taken to the office of a physician in that town, where he was treated for his injuries. This physician states that the deceased was acutely intoxicated when he first examined him and that he treated his injuries and that he left his office apparently all right so far as the injury was concerned. He was taken in custody by the highway police and taken to police headquarters in the same city and soon after his arrival there suffered an apparent collapse and died in a comparatively short time. The body was brought here and I participated in an autopsy to ascertain whether or not he died of injuries or from natural causes. The brain was normal, except for a slight gumma in the right parietal lobe. There was no hemorrhage of the brain or the meninges and no fracture of the skull. Contusions were present over the right eye, over the bridge of the nose and on the left arm. There were contused abrasions over the tip of the left shoulder and over the anterior surface of the tibia about midway of both legs. The heart and lungs were normal. No enlargement of the heart valves was apparent. There was full compensation. The lungs were normal. No trouble existed with the aorta or large vessels. The abdomen was normal except for slight enlargement with an apparently fatty degeneration and some granular degeneration. There was fatty degeneration of the penis, on which there was a scar from probable chancre on the dorsal surface. These conditions, however, were not sufficient causes for sudden death. In the stomach was a foreign body tightly embedded within the pyloric orifice at the outlet. Incision into the organ proved this to be a cork stopper from a vial or bottle. The cork measured 12 by 10 by 13 mm. No other solid contents remained in stomach. The man's family physician and the doctor who attended him for the injuries were both present at the autopsy. The family physician stated that the deceased had shown sugar in the urine for a considerable time. The doctor who attended his injuries verified the deceased's condition as acute alcoholic intoxication at the time of his injury. The question confronting us at present is whether this cork tightly embedded in the pyloric outlet could have been the cause of death, especially in the presence of a stomach full of liquid, as was apparently the case at the time of death and the existing diabetic condition.

M.D., Centralia, Ill.

ANSWER.—There is no reason to assign any importance in causing death to the small cork found at the outlet of the pyloric orifice.

The record submitted does not warrant any conclusion with respect to the exact cause of death. The description of the abdomen is not clear—"normal except for slight enlargement of what? with atypical fatty degeneration and some granular degeneration." Question may also be raised with regard to the statement that the brain: "normal, except for a slight gumma in the right parietal lobe." This is an unusual place for a gumma and one wonders whether the diagnosis of gumma is correct. The coronary arteries do not seem to have been examined, which is unfortunate especially in view of the fact that the patient may have had syphilis. As matters stand, acute alcoholic intoxication, shock due to the injuries received, and diabetic coma cannot be excluded as possible factors in the causation of death.

INCIDENCE OF EMBOLISM AFTER OPERATION

To the Editor:—I have an inquiry at hand relative to the percentage incidence of emboli secondary to gallbladder operations with removal or only drainage and also as to the percentage incidence of emboli secondary to operations for acute appendicitis. If there are any further data as to the frequency of emboli necessitating amputation of a leg secondary to an alleged sprain of the ankle joint, it would be of decided value to me. Kindly omit name.

M.D., Illinois.

ANSWER.—A paper by Earl F. Henderson (*Arch. Surg.* **15**:231 [Aug.] 1927) entitled "Fatal Pulmonary Embolism" contains one of the largest collections of statistics on the subject. Briefly, in one of the groups of cases which he studied there were 63,345 intra-abdominal operations; these operations were performed at the Mayo Clinic between 1917 and 1926. In this series of cases, in 11,689 operations on the gallbladder and ducts, the incidence of fatal postoperative pulmonary embolism was 0.30 per cent, whereas following 12,356 operations on the appendix the incidence of fatal pulmonary embolism was 0.02 per cent. Emboli following cholecystostomy were not separated from those following cholecystectomy. According to K. K. Nygaard, among 165,000 cases in which operation was performed at the Mayo Clinic there were approximately 1,700 instances of postoperative thrombosis and embolism, either nonfatal or fatal.

REPEATED ABORTIONS AND STERILITY

To the Editor:—A woman, aged 28, married nine years, desires to have a child. She had an induced abortion done in 1927 after a three and one half months pregnancy, another induced abortion in February 1931 after a ten weeks pregnancy and another induced abortion in November 1931 after a five and one half months pregnancy. In June 1934 she had a spontaneous abortion after ten weeks. No contraceptives have been used by either her or her husband since the last pregnancy. Her menstrual period occurs every twenty-four to twenty-eight days and lasts about four days. Some months she has more dysmenorrhea than others. She has had midmenstrual pains in the lower right quadrant almost every month since her appendectomy in 1925. Tonsillectomy was performed in 1928. The cervix was cauterized in 1935 and at present appears in good condition. The vaginal secretion and the cervical secretion react neutral to litmus. No masses can be felt in the adnexa. The uterus and cervix appear in good position. There is no history of venereal diseases. The Wassermann reaction is negative. The urine is normal. The blood pressure is rather low, being 108 systolic, 60 diastolic. A month and a half ago she had a dilation and a curettement done by another physician, who told her that it would help her. She is disappointed, as she expected to become pregnant soon after. The woman appears normal and in good health to the best of my knowledge. Can you tell me why she is unable to become pregnant again after being very fertile during the years 1927 to 1934 inclusive? Will you suggest a line of treatment that I may follow? Would a tubal insufflation be indicated? What about endocrines in this case? Would a trial at artificial insemination be of any benefit? Kindly omit name.

M.D., New Jersey.

ANSWER.—The repeated abortions which this woman has had may be the cause of her sterility. There is no mention of the type of recovery made from the last abortion. Not infrequently even when there are no outward signs of infection following an abortion there may be a mild salpingitis or perisalpingitis sufficient to produce closure of the tubes. Before anything further is done, it is advisable to examine the husband's semen to make certain that he is not the cause of the sterility. If the spermatozoa are normal, a tubal insufflation should be performed. It was unwise to perform a curettement without first being certain that the tubes were patent.

There is no indication for the use of endocrines in this case. If the tubal patency test reveals normal tubes, nothing further should be done for at least a few months and the patient should be encouraged with the information that she and her husband are normal and that a pregnancy may therefore occur without special treatment. The patient is unreasonable to expect fertilization to follow within a month and a half after a dilation and curettement even if the tubes are open. These operations are by no means always followed by pregnancy and it is unfortunate that the physician who performed the curettement promised the patient too much. There is no need to resort to insemination of sperm at the present time even if the tubes are found to be patulous. This procedure is a last resort and, of course, is to be employed only if the sperm are normal and the tubes are patent.

EPILEPTIC SEIZURE IN MOTION PICTURE OPERATORS

To the Editor:—A man who has been operating a moving picture machine for a number of years was brought to the hospital having an epileptic seizure and a clonic spasm in one of his arms. There is no previous history of any illnesses over a period of many years; he does not drink, his general health is good, and he has never had such a seizure before. The spinal Wassermann reaction is negative. I am of the opinion that some poison coming from the operation of the machine in a poorly ventilated room might be responsible for the condition. I will very much appreciate any help you can give.

M.D., Texas.

ANSWER.—A direct relationship between the work of a motion picture operator and the condition described in the query is improbable or at best may be established with difficulty. Some remote factors may be mentioned as possibly related. In some electric arcs, such as may be used for motion picture projection, traces of carbon monoxide may arise. Epileptoid seizures have been reported as a manifestation of carbon monoxide poisoning. In this event, some more characteristic features of carbon monoxide asphyxiation should clearly be detectable. The high temperatures at times present in booths place a burden on the normal functioning of the body, but epileptic seizures cannot be regarded as an anticipatable result. In years past, certain types of carbons used in arc lamps have been jacketed with metal to decrease the rate of burning. Metallic vapors thus produced may cause "metal fume fever." In one

claim before a compensation board, lead poisoning from this source was asserted. It is the intent of this discussion to indicate that while the work of the motion picture operator may be associated with various undesirable work conditions, none are known causes of epilepsy.

TREATMENT OF SYPHILIS COMPLICATED BY FUNCTIONAL PRURITUS

To the Editor:—A man, aged 26, contracted syphilis in April 1934. At that time he came under the care of another physician, who gave him a course of ten injections of neoarsphenamine and ten injections of a bismuth compound intramuscularly. Following this, two Wassermann reactions at monthly intervals were negative. In August 1934, while the patient was receiving treatment, he noticed a severe form of biting or burning subcutaneously distributed over the entire body. This burning or biting was of but a few seconds duration, only to recur in from half an hour to three or four hours later. He presented himself to me in December 1934, from which time on he received approximately forty injections of neoarsphenamine and forty injections of a bismuth compound intramuscularly. Up to the present time his sensation of biting and burning has been uninterrupted. Also at various times he has noticed tachycardia on retiring. A neurologic consultation revealed no pathologic changes due to syphilis. The consultant did make a presumptive diagnosis of either hypothyroidism or hyperthyroidism. A basal metabolic test revealed a minus 10. The iodides were given in dosages of seven drops three times a day without any amelioration of symptoms. Thyroid was given in dosages of one-tenth grain (0.006 Gm.) four times a day, with cessation of the tachycardia. Various drugs have been attempted with no relief. Urinalysis is negative, the blood pressure and temperature are normal, and physical examination is essentially negative. Anything you may be able to advise as to the future course of treatment for this patient will be appreciated. Please omit name.

M.D., Pennsylvania.

ANSWER.—In a man 26 years of age with burning and biting of the skin and no obvious cutaneous lesions, it would seem most likely that the complaint is of neurogenic origin. If the patient were 65 or older, the possibility of acarophobia would enter into consideration. The fact that he has received forty injections of neoarsphenamine and forty injections of a bismuth compound without the development of cutaneous complications of any sort would indicate that the burning and biting were not the result of the original course of neoarsphenamine and bismuth he received at the time the syphilis was recognized. The persistence of the symptoms during the rest interval from treatment strengthens this impression. The likelihood of an urticaria should be considered but apparently can be dismissed in view of the absence of any skin lesions. The same applies to infestation with scabies or other mites.

The development of a functional pruritus in this young man who recently acquired syphilis seems a plausible explanation for his complaint from the data given in the inquiry. If the blood and spinal fluid tests are now negative, two courses of a bismuth compound a year, fifteen injections each, for the next two years, would seem warranted. In addition, the repeated reassurance that his infection is controlled and the administration of a sedative should dissipate his complaint.

RESIDUAL PARALYSIS AND ANESTHESIA OF FOOT

To the Editor:—I have a patient, aged 10, with a residual paralysis and anesthesia of the right foot. About five years ago, when the child was attempting to learn to swim, the large toe was cut. This wound did not heal and x-ray examination revealed a slight involvement of the periosteum. In October 1935 the wound healed, but since then a large amount of callous formation has formed over the site of the old wound on the inside of the toe. An orthopedist prescribed shoes, which do not relieve the condition. In walking, the foot is everted and the toe greatly, so that the site of the old wound is the part at the bottom. Many methods have been tried to keep the toe in position without any success. There is slight sensation and motion present now for the first time. Is there any way of keeping the toe in position?

C. R. CHADBOURN, M.D., Janesville, Minn.

ANSWER.—Treatment in this case would depend to some extent on the etiology of the paralysis. Infantile paralysis rarely if ever produces anesthesia. Paralysis secondary to spina bifida may be of a mixed type with paralysis of some muscles and spasticity of others and quite commonly is associated with anesthesia. Lacerations, like trophic ulcers, in regions that are totally anesthetic, are characteristically slow in healing. Recurrent callous formation in the scar results from chronic trauma and can be relieved only by protection against the repeated injury. Reconstruction operations are contraindicated if the anesthesia persists, but partial return of sensation and muscle function would suggest that surgical stabilization of the foot be considered. This would tend to correct the eversion of the foot and the dragging of the toe in walking. Amputation of the toe in cases such as that described is justified if other measures fail to bring about healing.

ADMINISTRATION OF ANTITOXIN TO SENSITIVE PATIENT

To the Editor:—I have a patient to whom it has been necessary to give a prophylactic dose of antitetanus serum on two occasions within the past year. The first dose was accompanied by some degree of urticaria but no untoward symptoms. The second dose, given about three weeks ago, produced fever (103 F.), headache and violent pains in the knees and muscles of the calves. It was necessary to give morphine on several occasions to quiet the patient. My reason in writing is to ask your advice as to the advisability of using antitetanus serum following subsequent accidents if such occur. Undoubtedly this boy, who is 8 years old, will need prophylaxis again, and it would be with some temerity that I would administer the serum. Can you suggest a procedure that would obviate the likelihood of the foregoing or similar reactions? Please omit name.

M.D., Ohio.

ANSWER.—Should it seem advisable to administer antitetanic serum to the patient on some future occasion, one of the following plans may be adopted:

1. Use cow tetanus antitoxin instead of horse tetanus antitoxin, provided the latter was given on previous occasions. (There is a cow tetanus antitoxin on the market.)
2. Prior to serum injection, make a skin sensitivity test and, if positive, attempt to desensitize the patient. For the test, inject the serum intracutaneously in a dilution of at least 1 to 10. Do not attempt to make the tests with undiluted serum.
3. Before injecting tetanus antitoxin, add to it from 0.3 to 0.6 cc. of epinephrine of a 1:1,000 solution.

PSYCHOTIC IMPOTENCE

To the Editor:—I have a patient, 45 years of age, apparently in good health, whose only complaint is inability to have sexual intercourse. He is a man who has never had sexual contact with any woman but his wife, who died about one year ago. His impotence dates from that time. Previous to this he had intercourse every night. He has sexual desire and appetite but is unable to obtain an erection with any woman, although he has made several attempts with more than one woman. Often when he awakes in the morning and occasionally at other times, he has a strong erection. He states that he is in love with one of these women and would marry again if he could have sexual satisfaction. I can find nothing wrong on physical examination. He has a normal prostate. Please omit name.

M.D., Michigan.

ANSWER.—The cause of this man's impotence is obviously psychic and requires a thorough, lengthly psychiatric study. It will be necessary to know a great deal about the man and his relations with his late wife and numerous other facts which are not mentioned in the question.

INJECTION METHOD FOR VARICOSE VEINS

To the Editor:—A few patients have come to me with varicose veins and informed me that they have received injection treatments (of what, they knew not) and to no avail and wish to know if any other form of therapy is available. When I mention surgery, stripping the veins, with excision, they look askance and dubious. What in your opinion is the most serviceable agent to inject with the least reaction causing the percentage of sclerosis, generally speaking? I realize that certain solutions are more adaptable to certain types of veins. As a last resort, what agent would you say would give the highest percentage of sclerosis? What are its undesirable features? What are the reactions to it? What is the technic of its preparation and administration (if these are not obvious)? Thank you for any helpful suggestions in treating recalcitrant nonsclerosing veins.

DEE EDWARD FRANK, M.D., New York.

ANSWER.—The questions asked by the correspondent embrace the entire subject of the diagnosis and treatment of varicose veins. These questions and some others have been answered in a small pamphlet issued by the committee on varicose veins of the American Medical Association and printed in 1931 in connection with the Detroit session. Such pamphlets are available through the American Medical Association.

Generally speaking, no one can successfully undertake the treatment of varicose veins without having visited a well organized varicose vein clinic of a university or general hospital and received first-hand information from men who are handling a large number of cases. This is the best way to avoid pitfalls and discouraging results.

DRUGS FOR RELIEF OF PAIN

To the Editor:—Is there any drug or combination of drugs that may be given hypodermically, which will relieve pain (severe) and which is not an opiate derivative? Please omit name and address.

M.D., California.

ANSWER.—The problem of a satisfactory hypodermic analgesic to serve as a succedaneum for an opiate in the treatment of severe pain has not been solved as yet.

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 29-July 1. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ARKANSAS: *Basic Science.* Little Rock, Nov. 2. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock. *Medical (Regular).* Little Rock, Nov. 10. Sec., Dr. A. S. Buchanan, Prescott. *Medical (Eclectic).* Little Rock, Nov. 10. Sec., Dr. Clarence H. Young, 207½ Main St., Little Rock.

CALIFORNIA: Sacramento, Oct. 19-22. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: Hartford, Nov. 10-11. *Endorsement.* Hartford, Nov. 24. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden.

DELAWARE: Dover, July 13-15. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, Dover.

DISTRICT OF COLUMBIA: Washington, Jan. 11-12. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Jacksonville, Nov. 16-17. Sec., Dr. William M. Rowlett, P. O. Box 786, Tampa.

GEORGIA: Atlanta, Oct. 13. Joint-Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

HAWAII: Honolulu, Oct. 12-15. Sec., Dr. James A. Morgan, 48 Alexander Young Bldg., Honolulu.

ILLINOIS: Chicago, Oct. 20-22. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

IOWA: *Basic Science.* Des Moines, Oct. 13. Sec., Prof. Edward A. Benbrook, Iowa State College, Ames.

KANSAS: Topeka, Dec. 8-9. Sec., Board of Medical Registration and Examination, Dr. C. H. Ewing, 609 Broadway, Larned.

KENTUCKY: Louisville, Dec. 2-4. Sec., State Board of Health, Dr. A. T. McCormack, 532 W. Main St., Louisville.

LOUISIANA: New Orleans, December. Sec., Dr. Roy B. Harrison, 1507 Hibernia Bank Bldg., New Orleans.

MAINE: Portland, Nov. 3-4. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Regular.* Baltimore, Dec. 8. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 8-9. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 17-19. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Lansing, Oct. 14-16. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-3-4 Hollister Bldg., Lansing.

MINNESOTA: Minneapolis, Oct. 20-22. Sec., Dr. Julian F. DuBois, 350 St. Peter St., St. Paul.

MISSOURI: Kansas City, Oct. 21-23. State Health Commissioner, Dr. E. T. McGaugh, State Capitol Bldg., Jefferson City.

NEVADA: Carson City, Nov. 2-4. Sec., Dr. John E. Worden, Carson City.

NEW JERSEY: Trenton, Oct. 20-21. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, Oct. 12-13. Sec., Dr. Le Grand Ward, Santa Fe.

NORTH CAROLINA: *Endorsement.* Raleigh, Nov. 30. Sec., Dr. Ben J. Lawrence, 503 Professional Bldg., Raleigh.

NORTH DAKOTA: Grand Forks, Jan. 5-8. Sec., Dr. G. M. Williamson, 4½ S. 3rd St., Grand Forks.

OKLAHOMA: Oklahoma City, Dec. 9. Sec., Dr. James D. Osborn, Jr., Frederick.

OREGON: *Basic Science.* Portland, Nov. 21. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene. *Medical.* Portland, Jan. 5-7. Sec., Dr. Joseph F. Wood, 509 Selling Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Sec., Board of Medical Education and Licensure, Mr. James A. Newpher, Education Bldg., Harrisburg.

SOUTH CAROLINA: Columbia, Nov. 10. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: Pierre, Jan. 19-20. Dir., Division of Medical Licensure, Dr. Park B. Jenkins, Pierre.

TEXAS: Waco, Nov. 10-12. Sec., Dr. T. J. Crowe, 918-19-20 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 10-12. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 9-13. Sec., Dr. J. W. Preston, 28½ Franklin Road, Roanoke.

WEST VIRGINIA: Wheeling, Oct. 12-14. State Health Commissioner, Dr. Arthur E. McClue, Charleston.

WISCONSIN: Madison, Jan. 12-14. Sec., Dr. Henry J. Gramling, 2203 South Layton Blvd., Milwaukee.

SPECIAL BOARDS

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: Philadelphia, June. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written* examination will be held simultaneously in different centers of the United States and Canada in December. *Practical* or *clinical* examination will be given in St. Louis in April. Chairman, Dr. Walter L. Bierring, 406 Sixth Ave., Des Moines.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination and review of case histories of Group B candidates will be held in various cities in the United States and Canada, Nov. 7. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Cleveland, Jan. 9. Sec., Dr. Fremont A. Chandler, 180 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PATHOLOGY: Baltimore, Nov. 17-18. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit, Mich.

AMERICAN BOARD OF PEDIATRICS: San Francisco, Oct. 22-24. Baltimore, Nov. 15, and Cincinnati, Nov. 19. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 29-30. Application must be sent to the Secretary before Oct. 30. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., Washington, D. C.

AMERICAN BOARD OF UROLOGY: Chicago, Dec. 4-6. Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

Maryland June Examination

Dr. John T. O'Mara, secretary, Board of Medical Examiners, reports the written examination held in Baltimore, June 16-19, 1936. The examination covered 9 subjects and included 90 questions. An average of 75 per cent was required to pass. One hundred and fifty-six candidates were examined, 138 of whom passed and 18 failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
George Washington University School of Medicine	(1934) (1935) 82.5, (1936) 82.6, 83.6		82.2,
Howard University College of Medicine	76.6, 79.6, (1936) 75.1	(1935)	75,
Loyola University School of Medicine		(1936)	80.7
Johns Hopkins University School of Medicine	(1934) 79.2, (1935) 81.2, (1936) 77.1, 79.5, 80.4, 80.6, 81, 81, 81.5, 81.7, 81.7, 82, 82.2, 83, 83.1, 83.4, 83.4, 83.5, 84.1, 84.2, 84.5, 84.5, 85.1, 85.3, 85.6, 85.7, 86, 86, 86.1, 86.4, 87.1, 87.4, 87.5, 87.5, 88, 88, 89, 89.4, 89.7, 90.7	(1930)	84.6,
University of Maryland School of Medicine and College of Physicians and Surgeons	(1934) 84.5, (1935) 80.2, 86, (1936) 77.4, 78, 78, 78.5, 78.6, 79.4, 79.5, 80.1, 80.3, 80.4, 80.5, 80.6, 81.5, 81.7, 82, 82, 82.3, 82.7, 82.7, 83, 83.1, 83.2, 83.2, 83.5, 84, 84.1, 84.6, 85.1, 85.3, 85.3, 85.4, 85.4 85.6, 86, 86.2, 86.4, 86.5, 87.1, 87.2, 87.2, 87.4, 87.5, 87.5, 87.6, 87.6, 87.7, 88, 88.2, 88.7, 88.7, 89, 89, 89.2, 89.5, 90, 90.3, 91.3, 91.4	(1933)	82.7,
Harvard University Medical School		(1933)	86.1
University of Buffalo School of Medicine		(1936)	80.3
Jefferson Medical College of Philadelphia	(1934) 84.3, (1935)		79.7
Univ. of Pennsylvania School of Medicine	(1934) 82.6, (1935)		83.6
University of Virginia Department of Medicine		(1935)	81.3
Marquette University School of Medicine		(1931)	75.3
Queen's University Faculty of Medicine		(1932)	75.4
University of Toronto Faculty of Medicine		(1927)	78.1
Fellow of the Royal College of Physicians of London		(1935)	77.1*
Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin	(1932) 78.3,* (1934)		79.8*
Georg August-Universität Medizinische Fakultät, Göttingen		(1934)	82.5†
Johann Wolfgang Goethe-Universität Medizinische Fakultät, Frankfurt-am-Main		(1933)	77.6*
Ludwig-Maximilians-Universität Medizinische Fakultät, München		(1935)	85.3*
Regia Università degli Studi di Bologna. Facoltà di Medicina e Chirurgia	(1935) 75,* 76.6,*		83.1*
Regia Università degli Studi di Roma. Facoltà di Medicina e Chirurgia	(1932) 83.7, (1934) 81.2, (1935) 76.2,* 79,*		81.1*
Regia Università di Napoli Facoltà di Medicina e Chirurgia	(1928) 78.3,* (1934)		80.7*

School	FAILED	Year Grad.	Number Failed
Georgetown University School of Medicine	(1934, 2),	(1935)	3
Howard University College of Medicine		(1931)	1
University of Maryland School of Medicine and College of Physicians and Surgeons		(1935)	1
University of Nebraska College of Medicine		(1936)	1
Karl-Franzens-Universität Medizinische Fakultät, Graz		(1928)*	1
Johann Wolfgang Goethe-Universität Medizinische Fakultät, Frankfurt-am-Main		(1934)	1
Regia Università degli Studi di Bologna. Facoltà di Medicina e Chirurgia	(1934),*	(1935, 2)*	3
Regia Università degli Studi di Padova. Facoltà di Medicina e Chirurgia		(1935)*	1
Regia Università degli Studi di Palermo. Facoltà di Medicina e Chirurgia		(1928)*	1
Regia Università degli Studi di Roma. Facoltà di Medicina e Chirurgia		(1933), (1935, 2)*	3
Regia Università di Napoli Facoltà di Medicine e Chirurgia		(1923), (1932)	2

Thirteen physicians were licensed by reciprocity and 6 physicians were licensed by endorsement from April 6 through July 28. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Georgetown University School of Medicine	(1934) Pennsylvania	(1930)	Maine,
University of Illinois College of Medicine		(1931)	Illinois
Indiana University School of Medicine		(1931)	Indiana
Johns Hopkins University School of Medicine	(1933) North Carolina	(1927)	Dist. Colum.,
University of Maryland School of Medicine and College of Physicians and Surgeons	(1922) N. Carolina,	(1929)	Ohio
Boston University School of Medicine		(1922)	New York
Vanderbilt Univ. School of Medicine	(1933) Kentucky,	(1934)	Tennessee
Medical College of Virginia		(1935)	Virginia
University of Virginia Department of Medicine		(1933)	Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1935)	N. B. M. Ex.
Yale University School of Medicine		(1932)	N. B. M. Ex.
Northwestern University Medical School		(1934)	N. B. M. Ex.
Johns Hopkins University School of Medicine		(1934)	N. B. M. Ex.
University of Rochester School of Medicine		(1934)	N. B. M. Ex.
Duke University School of Medicine		(1934)	N. B. M. Ex.

* Verification of graduation in process.

† Verification of graduation in process. License has not been issued.

Book Notices

Interpretation of Laboratory Findings. By Raymond H. Goodale, M.D., Pathologist, City Hospital, Worcester, Mass. Cloth. Price, $2.25. Pp. 170. Philadelphia: F. A. Davis Company, 1936.

This is a concise collection of facts regarding the usual routine laboratory tests and their interpretation. The first part is devoted to a brief discussion of the normal values and the interpretation of abnormal values of the various body fluids and excretions. The second part is an alphabetical listing of diseases that show abnormal laboratory examinations. The third part is a short synopsis of the pathologic physiology of the body fluids and excreta, and the concluding part takes up methods of collecting and preparing body fluids and tissues for the laboratory. Such an organization is well adapted to the needs of the busy practitioner of medicine but it is doubtful whether the unusually brief treatment of the various subjects will satisfy his needs. It would also appear logical to have the third part, which deals with the pathologic physiology of body fluids and excreta, occupy the introductory chapter. In interpreting laboratory results one must transform laboratory data into a clear concept of the physiologic, biochemical and pathologic changes that could explain them. This section, aside from its position in the text, is not comprehensive enough to give the physician the necessary fundamental understanding of the laboratory test. The judicious use of diagrams or illustrations would have aided the text considerably. In a book as concise as this, a well selected bibliography would have been advantageous to the reader who desired to go beyond the information given in the text. The data included in the book are for the most part well selected and current. The volume is intended primarily for the physician who desires a concise statement on the interpretation of laboratory work.

Röntgenkymographische Bewegungslehre innerer Organe. Von Dr. med. habil. Pleikart Stumpf, Dozent für Röntgenologie an der Universität München, Dr. med. H. H. Weber, Röntgenfacharzt in Bern, und Dr. med. habil. G. A. Weltz, Röntgenfacharzt in München. Mit Beiträgen von Dr. med. W. Böhme et al. Paper. Price, 42 marks. Pp. 516, with 447 illustrations. Leipzig: Georg Thieme, 1936.

This book represents a remarkable series of studies made with a technic which is just coming into common use. As usual with such matters, the idea was put forth early in the history of roentgenology but was not used until recently when apparatus was worked out and perfected. The original idea was to put a metal grid with a series of narrow slits between the patient and the film, and then, during the exposure, to move either the film or the grid. If, then, as in the case of the heart, there is movement of the walls of the organ, such movement will show up as saw-tooth indentations in the shadow on the film. In this way it is possible to analyze minutely the movements of the various parts of an organ. Furthermore, by passing a fine beam of light through the part of the film containing the saw-tooth indentations and on to a photo-electric cell, and then recording the variations in the current with the help of a galvanometer and a mirror which writes on a moving sheet of light-sensitive paper, a curve can be obtained which closely resembles that obtained with a heart lever or with one of Wigger's pressure recording capsules. By putting the films also into a suitable apparatus and moving them in relation to the grid, the student can obtain a visual impression of the original motion of the organ studied. The book shows pictures of several pieces of apparatus which have been developed for the making of the films and for their analysis. The grid or the film may be moved up or down or laterally or diagonally and one can not only study the type of movement on the edges of the organ but also get some idea of the changing volume. Careful studies have been made not only of the heart and blood vessels but of disturbance in respiration and in the movements of the diaphragm in diseases such as asthma and tuberculosis. There is a chapter on movements of the esophagus, stomach and duodenum, and the urologists are also making use of the new technic. Although any one who looks through this book must be impressed with the tremendous amount of work that has been done and with the possibilities for exact recording of movements in various organs, he will be inclined to wonder how much new can be learned which will be of value either to the physiologist or to the clinician. One wonders how often this new technic will give information that cannot be secured in the older and simpler ways. So far as we can see now, it looks as if it will be most useful clinically in the study of those puzzling cases in which it is hard to distinguish between a tumor of the mediastinum and an aneurysm. The book is well written and beautifully illustrated and it will doubtless be a classic in the literature of roentgenology.

An Index of Treatment. By Various Writers. Edited by Robert Hutchison, M.D., LL.D., F.R.C.P., Consulting Physician, London Hospital. Eleventh edition. Fabrikoid. Price, $12. Pp. 1,020, with 147 illustrations. Baltimore: William Wood & Company, 1936.

In this day when it is so much the fad to gather together a number of treatises within single covers and call it a book, it would seem almost unpatriotic to question the soundness of the method as exemplified in an American conglomeration of the sort, since the custom is in fullest bloom on our side of the Atlantic. The present book being British, however, one may perhaps point out with impunity that it shares with all other tomes similarly put together the fault of lacking completely in cohesion and readability. Presented in the same format and by the same publishers, this index may be looked on as the companion volume to the equally well known index of differential diagnosis of which French is the editor. Dr. Hutchison, who presides editorially over the present volume, has as contributors ninety-one men, some writing only one article and some a great many. It is certainly an inclusive work, in our crude American jargon offering something for what-is-the-matter-with-you, be it mere symptom, well recognized disease entity, or a complaint of the rarefied nature of erythrocyanosis crurum puellarum frigida. Despite this encyclopedic nature, the general practitioner for whom the compilation has been put together must be at a loss nevertheless to understand the many imbalances in space allotment. For example, he will find not quite two pages on the important subject of eczema, yet immediately preceding in the alphabetical arrangement are twenty-two pages on electrotherapeutics. Similarly there are three pages on intubation in diphtheria, which has never yet been learned from a book, but the medical treatment of duodenal ulcer is given only slightly more than one page. The surgical treatment of aneurysm has eight pages, hypnotism a similar number; there are sixteen on foreign bodies in the air passages and esophagus, twenty-five on fractures of the long bones (including much on open operative procedures), and so on. The fact that the book has continued to appear at irregular intervals for nearly thirty years indicates that it must be much relied on by its British medical public, but one wonders whether the eminence of many of the contributors in their special fields and the general excellence of their articles entirely compensate for the facts that with few exceptions each author writes only of his own experiences and that there is not a single bibliographic reference in the entire 1,020 pages.

Über Sternalpunktionen. Von Elsa Segerdahl, Med. Lic. Akademisk avhandling som med tillstånd av medicinska fakulteten vid Uppsala Universitet för ernående av medicine doktorsgrad offentligen försvaras. Acta medica scandinavica, supplementum LXIV. Paper. Pp. 162, with 16 illustrations. Uppsala: Appelbergs Boktryckeriaktiebolag, 1935.

This is a comprehensive monograph on sternal bone marrow puncture. The first three chapters are devoted to a historical sketch of bone marrow puncture, the structure of bone marrow and the technic of sternal puncture. The author points out that with an increasing volume of bone marrow puncture material the absolute number of cells becomes lowered as the result of the admixture of blood with specific bone marrow cells. She therefore advises working with a small volume and she has selected 0.2 cc. Even with this precaution the absolute number of cells may vary and the values in different punctures in the same individual show decided fluctuations. The following chapters are concerned with a description of the morphology of normal and pathologic sternal punctures. The author discusses the various views concerning cell development but follows the belief that the youngest myeloblasts are the same stem cells of the erythrocytic and granulocytic systems. The point is emphasized that too much stress should not be placed on one bone puncture, as a different picture may be obtained in the same person with multiple punctures. Bone marrow puncture is only a needle investigation of a great organ of heterogeneous composition. Refinements of counting technic also are desirable. The limitations of the various technics are discussed. The author could not find any essential difference in the bone marrow picture for young men and young women; but in older persons the specific bone marrow elements were lower

in both sexes. In the pathologic conditions involving the erythropoietic tissue two types of anemia are chiefly considered, essential hypochromic and pernicious anemia.

The author's investigations substantiate the results obtained by other authors that in essential hypochromic anemia there is hyperplastic marrow with normal erythrocyte precursors while in pernicious anemia there is hyperplasia with a megaloblastic type of regeneration, which disappears during a remission. By bone marrow puncture the author was able to demonstrate the effectiveness of an injectible antipernicious anemia preparation more quickly than by any other method. With large doses of parenterally injected liver extract a reversal of the bone marrow picture can be seen in twenty-four hours. The use of bone marrow punctures in leukemia is next discussed and the author cites cases in which the procedure has been a distinct diagnostic aid. The author cites cases that clinically presented a characteristic picture of malignant neutropenia whereas bone marrow puncture disclosed the correct diagnosis. Cases of leukemia with prolonged anemic and leukopenic prodromes were correctly diagnosed only by sternal puncture. The final chapter summarizes the value of bone marrow puncture in diagnosis of obscure anemias and leukemia. Arinkin's method is preferred to that of Seyforth because of its simplicity. The author emphasizes, however, that a single cell poor puncture cannot be evaluated as a sign of bone marrow atrophy because of blood mixing with the marrow tissue. A high cell count with pathologic forms is more significant. A familiarity with normal bone marrow puncture smears is most desirable as a prerequisite in interpreting pathologic cases correctly.

The monograph is mainly a consideration of technic and interpretation of bone marrow punctures. The author shows a working knowledge of her subject and her statements are based on carefully evaluated results. The pertinent literature is well handled and the text is well illustrated with black and white photomicrographs. The work should prove of great value to the hematologist and the pathologist.

Theory and Practice of Psychiatry: A Psychiatric Textbook for Neuropsychiatric Specialists and General Practitioners of Medicine; A Reference Handbook for Psychologists, Sociologists, Pastors, and Other Professional Readers. By William S. Sadler, M.D., Chief Psychiatrist and Director, The Chicago Institute of Research and Diagnosis. Cloth. Price, $10. Pp. 1,231. St. Louis: C. V. Mosby Company, 1936.

This large tome covers much more material than does the usual textbook in psychiatry. Most textbooks have been confined to a study of the psychoses with an occasional chapter concerning the neuroses and possibly another on mental hygiene, but the present volume is different. It consists of five parts. There is a historical introduction before the first part, which is somewhat fragmentary, mentioning in a few paragraphs ancient, medieval and modern psychiatry with reference to freudian and adlerian psychology and schools of purely psychologic thought, such as the gestalt school. The present work is the first that incorporates a significant discussion of Adolf Meyer's psychobiology. One questions whether Dr. Meyer would be entirely convinced of the accuracy of this discussion. The author's discussion of this theory as involved in psychiatry goes into a great many different points of view. It discusses mental mechanisms, the unconscious and the subconscious, the significance of dreams, and other attitudes. It includes, as do the works of other writers, a discussion of symptomatology, diagnosis and prognosis of mental disease entities, and includes a description of methods of examining. The point of view is distinctly eclectic. The terminology of dynamic psychology is used to the extent that freudian mechanisms are described in a condensed form, but beyond that the author does not go.

Sadler's classification of disease entities can scarcely be accepted. It has never been presented before such groups as the Classification Committee of the American Psychiatric Association, and there are spots where there are duplications and subclassifications which are of questionable significance to the psychiatrist who is actively engaged in the field.

The second part of the volume, dealing with personality problems, is a conglomeration of material taken from elementary books on child training, rather superficial attitudes on the development of personality, and also short chapters on family relationships and adult personality, which, after all, are significant to the psychopathologist.

The third part of the volume is composed of a discussion of the neuroses, which is interesting because of the fact that for the first time the subject is extensively covered in a textbook. However, here again there are duplications, and the author's attempt to combine all neuroses into either psychasthenic states, neurasthenic states or hysterias is open to grave question. There is insufficient discussion of the dynamisms of these important subjects, but the author should be commended on the fact that his is the first textbook on psychiatry to go into the subject with any degree of completeness.

The fourth part is devoted to the psychoses. Here there is little difference between Sadler's presentation and that of the conventional psychiatric textbook.

The last part is devoted to psychotherapeutics. There are about 250 pages devoted to this important matter. Suggestion, hypnotism, rest and relaxation, play and recreation, and many other topics are discussed in brief and, while here again there is no tremendous depth to the discussion, the interested student will find much stimulating material. There is an excellent glossary at the end of the volume, although one must differ somewhat with some of Sadler's definitions. At the end of each chapter there is a bibliography largely consisting of elementary texts on the subject of the chapter rather than of specialized scientific articles.

The most severe criticism which can be laid against the volume is the fact that, while there is so much material which is included which is interrelated, on the other hand there is a great deal of duplication and considerable overemphasis on classification. Certainly the well trained psychiatrist is going to differ in many respects with Sadler's point of view and many probably will reject the book entirely, particularly because of its moral and religious undercurrent. For elementary students it may give a leading idea of psychiatry.

Les hépatonéphrites aiguës: Etude clinique, anatomique et expérimentale. Par Jean Vague, assistant à la Faculté de médecine de Marseille. Travail de la clinique médicale du Professeur D. Olmer et du laboratoire de médecine expérimentale et d'anatomie pathologique du Professeur L. Cornil. Paper. Price, 70 francs. Pp. 640, with 42 illustrations. Paris: Masson & Cie, 1935.

The author has attempted to correlate the clinical, anatomic and experimental features of hepatic and renal disease accompanying severe toxemias and infections under the caption "acute hepatonephritis." The book contains evidence and arguments on which the author bases his thesis, the subject being presented in nine chapters dealing with the historical aspects, clinical features, experimental phases and pathologic observations. Much emphasis is placed on etiology and pathogenesis. The bibliography is extensive, although mostly from the French literature. The typography is excellent and the photomicrographs are good. Hepatonephritis is regarded as a syndrome due to elective and systematic injury simultaneously to the liver and the kidneys, the term having been applied originally by Richardière in 1890. The etiologic agents are varied, including such poisons as carbon tetrachloride, cinchophen, mercury, uranium, phosphorus, diphtheria toxin, and mushroom poison. Infectious agents, for example the spirochetes of infectious jaundice, the virus of yellow fever and generalized bacterial infection by both aerobic and anaerobic micro-organisms, are frequent causes. The symptomatology is considered in detail under the syndromes "icteric," "vasculosanguine," "toxic" and "biologic." The clinical signs and symptoms for these types are presented in detail and are correlated with the chemical changes of the blood and urine. The chapter dealing with etiologic factors contains many case records supplying clinical details and chemical observations supporting the principal thesis of the author. Attempts to simulate these conditions experimentally are described in the chapter on experimental studies. Various kinds of animals were tested with such poisons as "apiol," mushroom poison, uranium, cantharidin and the toxins of the diphtheria and perfringens bacilli, and the "toxic syndrome" simulated closely that observed in man; the pathologic changes also were similar to those found in man. The section on pathologic anatomy is well presented, illustrated by numerous photomicrographs. An attempt is first made to summarize present conceptions regarding inflammation of the liver and kidneys. Necropsy material is then described histopathologically and an attempt made to analyze the results. Finally, an anatomic classification of acute hepatonephritis is suggested. The concluding chapter contains a few suggestions with regard to treatment, with emphasis on the importance of proper feeding with carbohydrate, diuresis, alkalization and

the intravenous use of chlorides. The book as a whole represents a vast amount of labor in gathering together the clinical, experimental and pathologic facts relating to severe acute injury to the liver and kidneys. Clinicians interested particularly in metabolic disturbances of the liver and kidneys will find the book stimulating. Pathologists will be interested in the French view with respect to acute hepatic and renal disease.

Die Zuckerkrankheit. Von Prof. Dr. Wilhelm Falta. Paper. Price, 15 marks. Pp. 322. Berlin & Vienna: Urban & Schwarzenberg, 1936.

This is a storehouse of the author's experience and of the literature on diabetes and is written in the best German style. It contains more than 1,100 references, and a liberal share of these are articles that have been published during 1934, 1935 and 1936. Any student of diabetes will wish to possess the book. Professor Falta has been in the thick of diabetic work. During the thirty years of his active medical career in Vienna he has been a prominent clinician. These pages, therefore, allow one to see in perspective not only the contributions of Falta and his many associates to diabetes but the places these occupy in the unfolding of diabetic knowledge during the last generation. The text is written in a simple and attractive manner and makes easy reading for English-speaking doctors, perhaps because of the author's sojourn years ago in the United States. The book contains facts and less of theory than certain of Falta's earlier writings. Professor Falta has kept in close touch with the work of American investigators and credit is given liberally to what has been done here. There are few pages in the book that do not contain some phrase, sentence or paragraph to be noted for future use. What one does miss comes from an evident lack of intimate association of the medical diabetic clinic with the surgical and obstetric diabetic clinics such as is in force in various parts of the United States. This has led the author to less optimistic conclusions about the desirability of aggressive surgery for gangrene and early delivery in the course of pregnancy than would otherwise be the case. The same holds true regarding the situation of diabetic children. One regrets that the author has not had an opportunity to see the larger camps for diabetic children, which are in this country such a feature in treatment. One's ideas regarding diabetes alter materially when privileged to see seventy diabetic children in camps during the course of one day, many of them taking insulin protaminate. Such a visit awakens a hopeful attitude which it is hard to overestimate.

The Patient and the Weather. Volume I, Part 2: Autonomic Integration. By William F. Petersen, M.D. With the assistance of Margaret E. Milliken, S.M. Cloth. Price, $9. Pp. 781, with 366 illustrations. Ann Arbor: Edwards Brothers, Inc., 1936.

The author of this volume is developing from many angles what is a most unusual work. First of all, the volumes are published beginning with the last and working forward. The present book is the second part of the first volume, leaving the first part of the first volume the only part now to be issued. There is a tremendous amount of information in this book, which is devoted to the influence of the weather on autonomic integration. Since the author now discusses in much detail comprehensive information about cyclonic circulation, temperature, humidity and other meteorological material, the real object of this ponderous research is beginning to be apparent. A brief summary of the book is almost impossible, for all sorts of relationships, physical facts and characterologic phenomena are pointed out, discussed and illustrated. To pick out a few chapters, one might point out that there is a discussion of the urine with relation to volume, acidity, phosphorus, effective meteorological rhythm and other subjects. There are chapters on headaches, colds, gastro-intestinal disturbances, moods and psychologic implications, growth, reaction of children, studies in blood changes, and a large chapter is devoted to season, climate and climatic cycles as regards tranquillity and variability, physiologic and chemical alterations, morbidity and death. The book is summarized in a chapter entitled "The Human Organism as a Cosmic Resonator." This volume like the others is profusely illustrated with meteorological graphs, chemical diagrams, maps, and photographs of subjects and of clouds. There are innumerable tables, many thorough case histories, and a detailed bibliography after each chapter. Some of the graphs are extremely complicated, having a multiplicity of changes in the many factors compared. All in all this monograph is a thoroughgoing piece of work which has some tendency to bear out the author's various predications about the relationship of the weather to bodily functions. The basic idea would seem to be that there are vascular and autonomic complexes which correlate with either temporary or long-time changes in the weather. It is difficult to point out any particular class of readers to whom the book will be most useful. It is too ponderous for the average physician, yet a physician or research man will want to know what Petersen has to say about the relation of the weather to his own particular field of interest.

Lehrbuch der inneren Medizin. Von H. Assmann, et al. Bände I und II. Third edition. Paper. Price, 48 marks, per set. Pp. 934, with 171 illustrations; 846, with 153 illustrations. Berlin: Julius Springer, 1936.

This appears just two years after the second edition. Every effort has been made to bring the book to date. A new chapter has been added on pathologic heredity of internal diseases written by Professor Siebeck. The chapter on general therapy by Professor Staehelin has been completely rewritten and the chapters on the diseases of the respiratory tract, metabolism, muscles, bones and joints have been thoroughly revised. The book is well illustrated and the roentgenograms, especially in the chapter on respiratory diseases, written by Assmann, himself a foremost radiologist, deserve favorable mention. There is an exhaustive subject index; an author's index is missing. The textbook in its present form fulfils its purpose as a valuable source of information for the student and the practitioner. The specialist probably will find his respective field not covered thoroughly enough and the literature, especially American, not completely considered. As a whole, however, the difficult task of presenting a modern cross section of the present state of internal medicine has been met successfully.

Diseases of the Nose, Throat and Ear for Practitioners and Students. Edited by A. Logan Turner, M.D., LL.D., F.R.C.S.E., Consulting Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh. With the collaboration of J. S. Fraser, M.B., F.R.C.S.E., Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh, and others. Fourth edition. Cloth. Price, $6. Pp. 473, with 264 illustrations. Baltimore: William Wood & Company, 1936.

This deservedly popular textbook continues to remain among the best of its type in our language. The text is concise but lacks little in information necessary for the student, general practitioner or even the specialist desirous of authoritative opinion. The illustrations on the anatomy of the ear, nose and throat as well as those on clinical pathology cannot be too highly praised. They have been carefully selected and their clarity leaves nothing to be desired.

Archiv und Atlas der normalen und pathologischen Anatomie in typischen Röntgenbildern. Röntgenatlas der Staublungenerkrankungen der Ruhrbergleute. Von Dr. G. Schulte, Leiter der Röntgenabteilung am Knappschafts-Krankenhaus, Recklinghausen. Unter Mitarbeit von Dr. K. Husten, Prosektor der Ruhr-Knappschaft am Knappschafts-Krankenhaus, Essen-Steele. Fortschritte auf dem Gebiete der Röntgenstrahlen, Ergänzungsband L, herausgegeben von Prof. Grashey. Paper. Price, 24 marks. Pp. 141, with 153 illustrations. Leipzig: Georg Thieme, 1936.

During the last five years this country has seen a frenzy of litigation centering about claims for silicosis among industrial workers. Often in these trials an unpraiseworthy medical spectacle has arisen because of the testimony of well meaning physicians lacking both experience and training to qualify them for technical testimony concerning silicosis and particularly the roentgenologic aspects of silicosis. Apparently a somewhat similar situation has arisen in Germany, for the purpose of this German roentgen atlas is better to acquaint the general practitioner with the x-ray characteristics of silicosis, silicotuberculosis and tuberculosilicosis. After a cursory discussion of the pathology of silicosis, its various degrees of severity and its status as an occupational disease, the greater part of this book is devoted to excellent reproductions in reduced size of roentgenograms. Part I presents twenty-five reduced size illustrations with two supplementary inserts of the actual size of the original film. The pictures in part I are designed to portray the different stages of silicosis alone and of silicosis associated with tuberculosis. Materials from twenty-six cases appear in part II, showing the evolution and progress of the disease, with emphasis on serial manifestations rather than on the finer details that are emphasized in part I. Two or three plates are shown for each case. An appendix of five plates is added to bring out the differential diagnosis between silicosis and tuberculosis. The reproduction of roentgenograms for publication purposes is nearly always unsatisfactory. This German publica-

tion, however, presents with great fidelity the appearance of nonstereopticon x-ray films. It is obvious that no reproduction can approach the original in clarity and refinement of detail; but here the printer's workmanship is of high order and constitutes a most commendable feature of this publication.

Diseases of the Respiratory Tract. Eighth Annual Graduate Fortnight of the New York Academy of Medicine. By 21 contributors. Cloth. Price, $5.50. Pp. 418, with 56 illustrations. Philadelphia & London: W. B. Saunders Company, 1936.

This comprises a series of lectures delivered before the graduate fortnight of the New York Academy of Medicine by specialists in the various phases of medical and surgical dealing with diseases of the respiratory tract. Manifestly it is impossible to give an adequate review of each lecture. The subject matter is well covered and the book can be recommended both to the general practitioner and to the specialist.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Optometry Practice Acts: Replacement of Broken Lens as Constituting the Practice of Optometry.—The replacement of an ophthalmic lens, said the Supreme Court of Appeals of West Virginia, by an optical mechanic by means of taking the measurements from a broken lens and manufacturing a new lens from such measurements does not constitute the practice of optometry in West Virginia. It constitutes the replacement of the lens by doing the "merely mechanical work" by an optical mechanic, as authorized by the optometry practice act.—*State v. McGrail (W. Va.), 183 S. E. 686.*

Workmen's Compensation Acts: Silicosis and "Wage Loss."—Marsz, a man 59 years of age who had been in the employ of the Schaefer Monument Company for twenty-six years, was discharged when a physical examination, required of all employees of the company by its new insurance carrier, showed that he had silicosis. Marsz claimed at that time, however, to the examining physician that "he was all right and could continue to do his work." Subsequently he instituted proceedings under the Wisconsin workmen's compensation act before the industrial commission. An examiner for the commission found that Marsz was suffering from silicosis in an advanced stage, caused by the exposure in his employment, and that, since as a result thereof he was incapable of more than slight physical exertion and could be employed only in occupations which involve so-called light work, he was 50 per cent disabled. The industrial commission confirmed those findings and awarded compensation accordingly. From a judgment of the circuit court for Dane county affirming the award the employer and his insurance carrier appealed to the Supreme Court of Wisconsin.

In general, the Wisconsin workmen's compensation act provides for compensation for such disability, whether resulting from accidental injury or from occupational disease, arising out of and in the course of employment, as results in a wage loss. The appellants seem to have contended that Marsz had suffered no wage loss. Wage, answered the Supreme Court of Wisconsin, is dependent on two factors: Time and rate of compensation. In *Zurich General Accident and Liability Ins. Co.* v. *Industrial Commission,* 203 Wis. 135, 233 N. W. 772, this court held that a worker who was transferred from a place of exposure to outside work at a diminished wage suffered a wage loss; that is, his rate of compensation per unit of time was diminished. The real source of difficulty, the Supreme Court continued, in silicosis cases is that many men suffering from the ailment in some of the various stages are able to and do continue to work and receive full compensation therefor long after they have sustained what has been referred to as a medical but what might be more properly referred to as a pathologic disability, and therefore as a matter of fact sustain no wage loss. It is because the legislature has so far seen fit to withhold compensation for physical impairment which does not immediately result in the physical incapacity of the claimant to work that the difficulty in these cases springs. There is a feeling that a person who has sustained loss of physical vigor and had his system invaded by foreign substances, which may and often do result in impairing his ability to work and not infrequently in death, should have compensation. If, however, the legislature had intended the term "disability" to embrace so-called medical or pathologic disability as distinguished from actual physical incapacity to work, it would undoubtedly have said so.

This court, continued the Supreme Court, has previously held that the injury or wage loss to be compensable must be sustained at a time when the relation of employer and employee existed. An amendment to the workmen's compensation act adopted thereafter (Laws, 1933, c. 314, sec. 27) provides that the time of injury or the occurrence of disability shall be deemed to be the last day of work for the last employer whose employment caused the disability. This obviously refers the time of injury or disability back to a point in time when the employer and employee relationship existed. Even if a plant shuts down and an employee is discharged and is not thereafter employed, if he is thereafter disabled, the time when his disability occurs is referred to the last day of employment which caused his disability. In the case at bar when it is considered that admittedly Marsz is suffering from silicosis, that as a result of it he is incapable of more than light physical exertion, that by reason of his physical incapacity he can be employed only in occupations which involve so-called light work, this court cannot say that there is no evidence to sustain the finding of the industrial commission that Marsz has sustained a wage loss, which, measured by the rate of compensation he had theretofore received, amounts to 50 per cent. The award in favor of the worker accordingly was affirmed.—*Schaefer & Co. v. Industrial Commission (Wis.), 265 N. W. 390.*

Society Proceedings

COMING MEETINGS

Academy of Physical Medicine, Boston, Oct. 20-22. Dr. Franklin P. Lowry, 313 Washington St., Newton, Mass., Secretary.
American Association of Railway Surgeons, Chicago, Nov. 5-7. Dr. Daniel B. Moss, 547 West Jackson Blvd., Chicago, Secretary.
American Clinical and Climatological Association, Richmond, Va., Oct. 26-28. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
American College of Surgeons, Philadelphia, Oct. 19-23. Dr. George W. Crile, 40 East Erie St., Chicago, Chairman, Board of Regents.
American Public Health Association, New Orleans, Oct. 20-23. Dr. Reginald M. Atwater, 50 West 50th St., New York, Executive Secretary.
American Society of Tropical Medicine, Baltimore, November 18-20. Dr. N. Paul Hudson, Department of Bacteriology, Ohio State University, Columbus, Ohio, Secretary.
Associated Anesthetists of the United States and Canada, Philadelphia, Oct. 19-23. Dr. F. H. McMechan, 318 Hotel Westlake, Rocky River, Ohio, Secretary.
Association of American Medical Colleges, Atlanta, Ga., Oct. 26-28. Dr. Fred C. Zapffe, 5 South Wabash Ave., Chicago, Secretary.
Association of Military Surgeons of the United States, Detroit, Oct. 29-31. Dr. H. L. Gilchrist, Army Medical Museum, Washington, D. C., Secretary.
Central Association of Obstetricians and Gynecologists, Detroit, Oct. 15-17. Dr. Ralph A. Reis, 104 South Michigan Blvd., Chicago, Secretary.
Central Society for Clinical Research, Chicago, Nov. 6-7. Dr. Lawrence D. Thompson, 4932 Maryland Ave., St. Louis, Secretary.
Delaware, Medical Society of, Rehoboth, Oct. 12-14. Dr. William H. Speer, 917 Washington St., Wilmington, Secretary.
Inter-State Postgraduate Medical Association of North America, St. Paul, Oct. 12-16. Dr. W. B. Peck, 27 East Stephenson St., Freeport, Ill., Managing Director.
National Society for the Prevention of Blindness, Columbus, Ohio, Dec. 3-5. Mr. Lewis H. Carris, 50 West 50th St., New York, Managing Director.
New York State Association of Public Health Laboratories, Albany, Nov. 6. Miss Mary B. Kirkbride, New Scotland Avenue, Albany, Secretary.
Omaha Mid-West Clinical Society, Omaha, Oct. 26-30. Dr. J. D. McCarthy, 107 South 17th St., Omaha, Secretary.
Radiological Society of North America, Cincinnati, Nov. 30-Dec. 4. Dr. Donald S. Childs, 607 Medical Arts Building, Syracuse, N. Y., Secretary.
Southern Medical Association, Baltimore, November 17-20. Mr. C. P. Loranz, Empire Building, Birmingham, Ala., Secretary.
Southwestern Medical Association, El Paso, Texas, Nov. 19-21. Dr. Orville E. Egbert, 116 Mills Street, El Paso, Secretary.
Texas Ophthalmological and Oto-Laryngological Society, Fort Worth, Dec. 4-5. Dr. Kelly Cox, 1719 Pacific Ave., Dallas, Secretary.
Tri-States Medical Society of Texas, Louisiana and Arkansas, Longview, Texas, Oct. 26-27. Dr. John M. Ellis, Mt. Pleasant, Texas, Secretary.
Vermont State Medical Society, Burlington, Oct. 15-16. Dr. William G. Ricker, 33 Main St., St. Johnsbury, Secretary.
Virginia, Medical Society of, Staunton, Oct. 13-15. Miss Agnes V. Edwards, 1200 East Clay St., Richmond, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers in continental United States and Canada for a period of three days. Periodicals are available from 1926 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them. Titles marked with an asterisk (*) are abstracted below.

American Journal of Anatomy, Philadelphia

59: 175-344 (July 15) 1936. Partial Index

Studies in Wave-Mechanics of Muscle Form and Function: II. Experimental Biophysics of External Form and Internal Structure of Cross-Striated Muscle and Tendon. E. J. Carey, Milwaukee.—p. 175.

Relation of Lymphoid Tissue to Process of Blood Production in Avian Bone Marrow. H. E. Jordan, Charlottesville, Va.—p. 249.

Biological Properties of Mare Gonadotropic Hormone. H. H. Cole, Davis, Calif.—p. 299.

Development of Anus in Human Embryo. E. M. Tench, Buffalo. —p. 333.

American Journal of Cancer, New York

27: 421-652 (July) 1936

*Thymoma and Thymic Hyperplasia in Myasthenia Gravis: Observations on General Pathology. E. H. Norris, Minneapolis.—p. 421.

Cancer Family of Warthin: Further Report. I. J. Hauser and C. V. Weller, Ann Arbor, Mich.—p. 434.

Influence of Hormones on Breast Hyperplasia and Tumor Growths in White Rats. J. Heiman and O. F. Krehbiel, New York.—p. 450.

Liposarcoma Produced by 1: 2-Benzpyrene. C. D. Haagensen and O. F. Krehbiel, New York.—p. 474.

Fate of Intravenously Injected Tumor Cells. S. Warren and Olive Gates, Boston.—p. 485.

Pigmentary Response in Phoxinus Laevis: Effect of Blood from Patient with Melanosarcoma. E. B. Astwood and C. F. Geschickter, Baltimore.—p. 493.

Hemoglobin Levels in Various Degrees of Susceptibility to Spontaneous Tumors. L. C. Strong, New Haven, Conn.—p. 500.

Gross and Microscopic Diagnoses in Mouse Tumors at Site of Mammary Glands. A. M. Cloudman, Bar Harbor, Maine.—p. 510.

Influence of Complete Blockage of Nipple on Incidence and Location of Spontaneous Mammary Tumors in Mice. Elizabeth Fekete and C. V. Green, Bar Harbor, Maine.—p. 513.

Extrachromosomal Influence in Relation to Incidence of Mammary and Nonmammary Tumors in Mice. W. S. Murray and C. C. Little, Bar Harbor, Maine.—p. 516.

Spontaneous Incidence of Lung Tumors in Relation to Incidence of Mammary Tumors in an Inbred Strain of Albino Mice (Strain A): Preliminary Report. J. J. Bittner, Bar Harbor, Maine.—p. 519.

*Evidence for an Endocrine Factor in Etiology of Mammary Tumors. H. C. Taylor Jr., New York.—p. 525.

Further Studies on Relation of Functional Activity to Mammary Carcinoma in Mice. H. J. Bagg, New York.—p. 542.

Thymoma and Thymic Hyperplasia in Myasthenia Gravis.—Norris is of the opinion that pathologic changes may be found in the thymus in cases of myasthenia gravis in direct ratio to the care with which they are sought. With the addition of the four cases described here and the six reported elsewhere since 1917 the incidence of thymic lesions remains at 50 per cent. This figure probably expresses the frequency of grossly recognizable lesions of the thymus. It seems possible, however, that thymic lesions which have produced little or no macroscopic alteration of the suprapericardial tissue may have been overlooked in some of the reported cases. The author lists in chronological order the cases of myasthenia gravis in which the necropsy disclosed thymic lesions. In discussing the material the author points out that of the thirty-five cases tabulated eighteen were classified by the various authors as representing instances of an enlarged or persistent thymus and seventeen cases were classified as tumors of the thymus. These reported cases, therefore, are divided into two almost equal groups. A casual survey of the descriptive data indicates that the line of separation is not sharp and that the bases for distinctive classification are uncertain. In some of the cases listed as enlarged thymus the thymic mass was as large as or larger than certain of those designated as tumors. The difficulties encountered in differentiating between a benign thymoma and an enlarged thymus in which there is an extensive epithelial hyperplasia is well illustrated by two of the cases of the group of four described in detail. The author decided to designate the pathologic conditions that have been regarded as benign tumors of the thymus as conditions of extreme epithelial hyperplasia, and the pathologic conditions that have been regarded as instances of enlargement or persistence of the thymus as conditions of moderate epithelial hyperplasia.

Endocrine Factor in Etiology of Mammary Tumors.—According to Taylor, any attempt to define the stage to which clinical and experimental work has carried the theory of an endocrine cause for breast cancer is difficult and is certain to receive little approval. He nevertheless offers the following points as perhaps the most important: 1. The ovarian hormone is essential for the development and preservation of the epithelium of the mammary gland. Without it there is no tissue on which any carcinogenic agent may act. This is the most obvious reason why cancer of the breast does not develop in early castrates or in untreated male mice. 2. The development of breast cancer in mice after the injection of large quantities of estrogenic substance may be brought about in several ways: (*a*) by a direct carcinogenic action comparable with that of various tar derivatives; (*b*) by increasing the normal physiologic impulse to proliferation until it produces atypical structures; (*c*) by the production of abnormal activities of the cells the secretions of which provide the carcinogenic factor. 3. Tumors of the human mammary gland are also dependent on the ovary at least to the extent that the normal tissue from which the tumors must arise are provided by the ovarian hormone. 4. An existent ovarian function is apparently essential for the common types of chronic mastitis and fibro-adenoma, the development of which is practically limited to the years of mature sexual life. This is not true of carcinoma, which may appear long after the menopause. 5. With the neoplastic disease once established, a marked response to variations in glandular function, such as those incident to pregnancy and the menopause, is noted in chronic mastitis and fibro-adenoma. A moderate reaction to these changes is observable in some cases of carcinoma. 6. Some evidence of a glandular dysfunction can be found in certain cases of chronic mastitis, but hormone states comparable to those necessary to produce mammary carcinoma in mice by the injection of estrogenic substance are unknown in women. 7. There is no clinical evidence yet of any specific endocrine dysfunction as the cause of human breast cancer.

American J. Digestive Diseases and Nutrition, Chicago

3: 375-456 (Aug.) 1936

Classification of Gastroduodenal Ulcers on Basis of Their Etiology. S. C. Robinson, Chicago.—p. 375.

New Experiences with Simmonds' Disease. K. Herman, Subotica, Yugoslavia.—p. 382.

Value of Routine Red Cell Sedimentation Test in Gastro-Enterology. M. Golob and H. Borowsky, New York.—p. 387.

Bacteriologic Findings in Disease of Biliary Tract: Relationship of Gastric Acidity to Biliary Tract Infection. J. R. Twiss and E. C. Hanssen, New York.—p. 391.

Fate of Bacteria Injected Directly into Cecal End of Colon. L. Weinstein, New Haven, Conn.—p. 397.

Nature of Peptic Ulcerations: Factor of Spasm. M. E. Steinberg, Portland, Ore.—p. 399.

Studies in Absorption of Undigested Proteins in Human Beings: VI. Absorption of Unaltered Protein from Abnormal Gastro-Intestinal Tract. I. Gray and M. Walzer, Brooklyn.—p. 403.

Chemical Nature of Antianemic Principle. J. Schultz, Ann Arbor, Mich.—p. 405.

Functional Changes of Vermiform Appendix Producing Diverticular Sacculation of Spastically Contracted Organ. A. Galambos, New York.—p. 412.

III. Rate of Absorption of Salicylates and Effect of Certain Compounds on Rate of Absorption of Acetylsalicylic Acid from Stomach and Intestine. W. B. Bradley, J. G. Schnedorf and A. C. Ivy, Chicago.—p. 415.

*Control of Gastric Acidity in Peptic Ulcer by Alkalinized Powdered Whole Milk Tablets. P. H. Wosika, Chicago.—p. 419.

Extrapancreatic Hypoglycemia. J. F. Briggs and H. Oerting, St. Paul. —p. 436.

Regional Ileitis. F. G. Connell, Oshkosh, Wis.—p. 438.

Gastro-Intestinal Bleeding in Disease of Liver and Biliary Tract. S. S. Lichtman, New York.—p. 439.

Alkalinized Milk Tablets in Peptic Ulcer.—Wosika points out that in a previous paper he and his collaborator Emery evaluated the effect of the routine Sippy treatment on the control of acidity in forty-six cases of duodenal ulcer. It was found that symptoms were abolished and that the free acidity was adequately controlled in slightly more than half. A

second report compared the use of a liquid mixture of powdered whole milk, in addition to an alkali powder, with the routine Sippy procedure and demonstrated that the former was the more effective as a neutralizing agent. The purpose of the present study is to determine the value of tablets composed of powdered whole milk and varying amounts of alkalis on the neutralization of the gastric acidity in patients with peptic ulcer. For this study twenty-six patients with peptic ulcer were selected from the medical clinic of Northwestern University. Roentgenologic evidence for ulcer was positive in all save two cases and the clinical history of both of these exceptions was too typical to doubt. All the patients were men between the ages of 26 and 66 years. The average age was 44 years. Ulcer symptoms had been present from one to twenty years, with an average of nine years. Three of the group had gastric ulcers and, because they had relatively high acid values as determined by a histamine gastric analysis, they were included in the series. The patients reported to the clinic about once a week in the morning, and all meals (the usual foods allowed on the fourth week Sippy regimen) were served at Passavant Memorial Hospital at 8 a. m., 1 p. m. and 6 p. m. Between meals they were given tablets or milk and cream. The author found that tablets composed of powdered whole milk (12.5 Gm.), sodium bicarbonate (0.6 Gm.) and calcium carbonate (2 Gm.) are slightly more effective than the routine Sippy procedure as regards the neutralization of the gastric acidity.

American Journal of Diseases of Children, Chicago

52: 259-512 (Aug.) 1936

*Pectin-Agar Preparation for Treatment of Diarrhea of Infants. M. Winters and C. A. Tompkins, Indianapolis.—p. 259.

Basal Metabolism of Tuberculous Children. Anne Topper and H. Rosenberg, New York.—p. 266.

Prognosis of Rheumatic Infection in Childhood: Statistical Study. Rachel Ash, Philadelphia.—p. 280.

*Abdominal Syndrome of Rheumatic Disease in Childhood. J. B. Wolffe, Philadelphia, and C. J. Brim, New York.—p. 296.

Allergy Due to Menotoxin of Pregnancy. M. A. Perlstein and A. Matheson, Chicago.—p. 303.

Familial Congenital Adrenal Syndrome. H. Jacobziner and A. Gorfinkel, New York.—p. 308.

Anthropometric Study of New-Born Infants of Japanese Parents in America. P. K. Ito, Los Angeles.—p. 321.

Pulmonary Gangrene in Children. J. W. Epstein, Cleveland.—p. 331.

Generalized Lipoidosis in Case of Amaurotic Familial Idiocy. C. Davison and S. A. Jacobson, New York.—p. 345.

Pneumothorax of the New-Born: Report of Third Case of Infectious Type, with Comments on Pathogenesis of This Type. S. J. Wilkinson, Decatur, Ill.—p. 361.

Calcinosis Universalis and Calcinosis Circumscripta in Infancy and in Childhood: Three Cases of Calcinosis Universalis, with Review of Literature. J. L. Rothstein and Sara Welt, New York.—p. 368.

Pectin-Agar Preparation for Treatment of Diarrhea of Infants.—Winters and Tompkins show that objections are raised to scraped raw apple as a treatment for diarrhea. A substitute is offered, made with pectin, agar-agar and a dextrin-maltose preparation. Observations and data are recorded on twenty-four patients treated with this substitute and on eighteen patients treated with scraped raw apple. Data are offered to show that the group treated with the substitute responded better than the group fed scraped raw apple.

Abdominal Syndrome of Rheumatic Disease.—Wolffe and Brim call attention to a group of children in whom recurrent abdominal cramps lasted from six months to several years and apparently were the only subjective manifestation of an active phase of rheumatic disease. They present cases illustrating the importance of recognizing the existence of an abdominal syndrome of rheumatic disease. They think that, excepting indiscretion of diet, active childhood rheumatism is probably the most important cause for such abdominal symptoms, provided the attacks of cramps are transitory and apparently inconsequential. Other manifestations of the active phase of rheumatic disease are frequently associated with it, such as pallor, weight fixation in spite of a properly balanced diet, irritability without any apparent cause, twitchings and tics, often looked on as habit spasms because of their chronicity, aches and pains in various joints and muscles, often attributed to rapid growth, and enuresis after the control of the bladder has been established. In spite of the fact that several of these manifestations are invariably seen in any case, the condition is frequently overlooked, and an active rheumatic state is often unrecognized until organic heart disease is accidentally discovered during the course of a physical examination. The authors are convinced that the greatest degree of cardiac change occurs during the unrecognized active phase of the disease.

American Journal of Physiology, Baltimore

116: 245-494 (July) 1936. Partial Index

Adaptation to Transposition of Eye Muscles. J. M. D. Olmsted, M. Margutti and K. Yanagisawa, Berkeley, Calif.—p. 245.

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Effect of Prolonged Anoxemia on Heart and Spleen in the Mammal. E. J. Van Liere, Morgantown, W. Va.—p. 290.

Alterations in Electrical Field Produced by Changes in Contacts of Heart with Body. L. N. Katz, I. Gutman and F. H. Ocko, Chicago.—p. 302.

Blood Sugar and Glucose Tolerance at High Altitudes. W. H. Forbes, Boston.—p. 309.

Influence of Bile on Excretion of Sterol in Feces. A. Shapiro and H. Koster, Brooklyn.—p. 317.

Site and Mechanism of Antiketogenic Action of Insulin. I. A. Mirsky, Cincinnati.—p. 322.

Influence of Partial Pressure of Oxygen on Body Temperature. E. Gellhorn and A. Janus, Chicago.—p. 327.

Chloride and Alkali Content of Duodenal Secretions and Their Relation to Gastric Acidity and Emptying Time. F. L. Apperly and M. K. Cary, Richmond, Va.—p. 337.

Effect of Good Electrical Conductors Introduced Near the Heart on Electrocardiogram. L. N. Katz, E. Sigman, I. Gutman and F. H. Ocko, Chicago.—p. 343.

Effects on the Heart Rhythm of Premature Stimuli Applied to the Pacemaker and to the Atrium. A. S. Gilson Jr., St. Louis.—p. 358.

Lactic Acid in Rest and Work at High Altitude. H. T. Edwards, Boston.—p. 367.

Reflex Respiratory Effects from Intermittent Stimulation of Vagus and Superior Laryngeal Nerves. C. J. Hillenbrand and T. E. Boyd, Chicago.—p. 380.

Physiologic Significance of Electric Responses of Smooth Muscle. A. Rosenblueth, H. Davis and B. Rempel, Boston.—p. 387.

Sensitization of Sympathetic Ganglion by Preganglionic Denervation. W. B. Cannon and A. Rosenblueth, Boston.—p. 408.

Adequacy of Chemical Theory of Smooth Muscle Excitation. A. Rosenblueth and W. B. Cannon, with assistance of B. Rempel, Boston.—p. 414.

Experiments on Intact and Adrenalectomized Dogs Subjected to Sodium and Chloride Depletion by Intraperitoneal Injections of Glucose. W. W. Swingle, W. M. Parkins and A. R. Taylor, Princeton, N. J.—p. 430.

Relation of Serum Sodium and Chloride Levels to Alterations of Body Water in Intact and Adrenalectomized Dog, and Influence of Adrenal Cortical Hormone on Fluid Distribution. W. W. Swingle, W. M. Parkins, A. R. Taylor and H. W. Hays, Princeton, N. J.—p. 438.

Studies of Energy of Metabolism of Normal Individuals: A Standard for Basal Metabolism, with Nomogram for Clinical Application. W. M. Boothby, J. Berkson and H. L. Dunn, Rochester, Minn.—p. 468.

Id.: Comparison of Estimation of Basal Metabolism from (1) Linear Formula and (2) "Surface Area." J. Berkson and W. M. Boothby, Rochester, Minn.—p. 485.

Annals of Surgery, Philadelphia

104: 161-320 (Aug.) 1936

Surgical Treatment of Irremovable Cancer of Pyloric Segment of Stomach. R. Maingot, London, England.—p. 161.

Mycotic Infection of Stomach: Report of Case with Perforation. C. Bearse, Boston, and L. H. Pollock, New York.—p. 167.

Pathologic Changes in Exteriorized Gastro-Intestinal Grafts. T. S. Raiford and T. Eberhard, New York.—p. 175.

Solid Tumors of Mesentery. J. T. Hart, Columbia, Tenn.—p. 184.

Mechanism and Significance of Obliteration of Lumen of Vermiform Appendix. D. C. Collins, Los Angeles.—p. 199.

Postanginal Sepsis: Caused by Newly Described Hemophilic Anaerobic Bacillus. W. A. Altemeier, Detroit.—p. 212.

Aspiration of Breast Cysts. F. S. Mathews, New York.—p. 220.

*Chronic Progressive Postoperative Gangrene of Abdominal Wall. H. G. Willard, Tacoma, Wash.—p. 227.

Elective Transverse Abdominal Incision. F. S. Lynn and H. C. Hull, Baltimore.—p. 233.

Sacrococcygeal Transrectal Approach for Repair of High Rectovaginal and Vesicovaginal Fistulas. J. C. A. Gerster, New York.—p. 244.

Ureteral Transplantation and Cystectomy. A. G. Brenizer, Charlotte, N. C.—p. 248.

Strictures of Prostaticomembranous Urethra: Newer Methods in Management of Difficult Lesions. H. H. Young, Baltimore.—p. 267.

Rectal Stricture Due to Lymphopathia Venereum: Clinical and Pathologic Study of Six Cases Observed at Necropsy. L. Lichtenstein, New Orleans.—p. 279.

Suppurative Arthritis of Sacro-Iliac Joint. J. B. L'Episcopo, Brooklyn.—p. 289.

*Serum Phosphatase in Fracture Repair. C. L. Mitchell, Detroit.—p. 304.

Chronic Progressive Postoperative Gangrene of the Abdominal Wall.—Willard reports the case of a woman, aged 57, who underwent an operation for acute appendicitis. The appendix showed beginning gangrene. The woman was

discharged from the hospital on the nineteenth day following operation. Soon after, however, the wound began to break down rapidly, and, in spite of the fact that the drainage from the depths of the wound gradually ceased, there developed a progressive spreading gangrenous ulceration of the skin and subcutaneous tissues. The patient was given a blood transfusion and antistreptococcus serum without apparent benefit. The first bacteriologic cultures that were taken on her readmittance to the hospital showed an enormous number of hemolytic streptococci with an occasional colony of staphylococci and B. coli. From the necrotic tissue a hemolytic staphylococcus was obtained. Cultures taken from a piece of tissue excised from the red area adjacent to the normal skin gave, by the anaerobic technic, a growth of nonhemolytic anaerobic streptococcus in pure culture. After two generations, this nonhemolytic anaerobic streptococcus showed slight aerobic growth on Loeffler's blood serum. This corresponds culturally to the organisms which Meleney had found in similar cases. He has designated this as "micro-aerophilic." Following radical excision, the wound was dressed daily with gauze saturated with a suspension of zinc peroxide in sterile water, which was covered with petrolatum gauze to prevent drying. Later, skin grafting was done. The author says that Meleney described several different types of superficial infectious gangrene. Examples of the acute types are "gas gangrene" and "hemolytic streptococcus gangrene." Neither produces marked local pain or sensitiveness, but both produce extreme prostration and result in a high mortality. The case described in this report represents one of the more chronic forms of infectious gangrene. In the conclusion the author points out that this condition represents a rather rare instance of chronic infectious, superficial, progressive gangrene which belongs to a definite clinical group and which should be recognized clinically. It is differentiated clinically from other types of superficial gangrene by its slow and relentless progression, its severe local symptoms and the absence of severe systemic symptoms. It is characterized bacteriologically by the fact that it is produced by two organisms, neither of which alone may be virulent but which in combination produce a virulent infection. It is important that the nature of this infection be recognized early and that wide and radical excision be employed promptly.

Serum Phosphatase in Fracture Repair.—Mitchell studied a series of seventy-five unselected major fractures in order to determine the possible clinical significance and the relationship between the healing of fractures and the activity of the enzyme phosphatase of the serum. Serial determinations of serum phosphorus and phosphatase were made the day following fracture and thereafter at weekly intervals for the following three weeks. In a few cases the studies were followed until union was complete. With the knowledge that diet, especially a high carbohydrate diet, could produce variation in the serum phosphatase level, it was thought advisable to keep these patients on a standard diet. However, it was found to be very difficult to keep this number of patients on a weighed diet over the length of time necessary, and accordingly a uniform diet was planned and given in all fracture cases under study. The Bodansky method of phosphatase determination has been used throughout in this series. According to Bodansky, the average normal adult serum phosphatase reading is 2.6 units, with levels ranging from 1.5 to 4. In serial determinations on normal individuals taken at weekly intervals, an average fluctuation of about one unit has been found. Accordingly, in computing whether there has been an increase or decrease in the serial determinations in this series, allowance has been made for this error. On the basis of his studies the author reaches the following conclusions: 1. There is not a consistent rise in the serum phosphatase level in the course of fracture healing, although in many cases there is a slight increase, while in a smaller group there is a decrease. 2. The increased serum phosphatase activity following fractures appears to be secondary to the increased activity at the fracture site and not vice versa. 3. The serum phosphatase level following fracture is not an index of the healing or rate of healing of the fracture. 4. No significant change in the blood phosphorus level following fracture was noted.

Archives of Internal Medicine, Chicago

58: 187-372 (Aug.) 1936

Pituitary Basophilism (Cushing's Syndrome): Report of Verified Case, with Discussion of Differential Diagnosis and Treatment. R. H. Freyberg, P. S. Barker, L. H. Newburgh and F. A. Coller, Ann Arbor, Mich.—p. 187.

Calcium and Phosphorus Metabolism in Verified Case of Pituitary Basophilism. R. H. Freyberg and R. L. Grant, Ann Arbor, Mich.—p. 213.

Obesity and Energy Exchange in Verified Case of Pituitary Basophilism. R. H. Freyberg and L. H. Newburgh, Ann Arbor, Mich.—p. 229.

*Chronic Pulmonary Infection Due to Friedländer Bacillus: Further Observations. L. H. Collins Jr., Philadelphia.—p. 235.

Convulsive Seizures in Adult Life. A. E. Walker, New Haven, Conn.—p. 250.

Morphologic Changes in Heart in Experimental Myxedema. B. Webster and C. Cooke, New York.—p. 269.

Effect of Alkaline Therapy for Peptic Ulcer on Utilization of Dietary Iron in Regeneration of Hemoglobin. F. Kellogg and S. R. Mettier, San Francisco.—p. 278.

Etiologic Significance of Streptococci in Epidemic Encephalitis: I. Incidence of Streptococci in Cultures from Patients with Encephalitis in St. Louis and from Normal Controls, and Characteristics of Various Strains Isolated. K. L. Burdon, E. W. Thurston, P. L. Varney and J. Bronfenbrenner, St. Louis.—p. 285.

*Studies of Mechanism of Circulatory Insufficiency in Raynaud's Disease in Association with Sclerodactylia. M. Prinzmetal, Los Angeles.—p. 309.

Infectious Diseases: Review of Current Literature. H. A. Reimann, Philadelphia.—p. 329.

Chronic Pulmonary Infection Due to Friedländer Bacillus.—Collins points out that in a previous publication his associates and he described the clinical and roentgenologic features of three cases of pneumonia with recovery and expressed the belief that the organism responsible for the production of the pulmonary lesion was the Friedländer bacillus (Bacillus mucosus-capsulatus). The author's purpose in the present paper is to present follow-up data on these three original cases and to record observations on a fourth nonfatal case in which they succeeded in isolating the Friedländer bacillus in a culture of the blood during the height of the pneumonia. One of the three patients on whom follow-up data are presented was still living more than seven and one-half years after the attack of pneumonia. One patient died of an apparently unrelated infection two years after the attack of pneumonia. The third patient was lost from view. The fourth patient, in whom the Friedländer bacillus was isolated from both the sputum and the blood during the acute stage of the pneumonia, is now doing manual labor, more than two and one-half years after the attack of pneumonia. At the site of the original pneumonic lesion there are still marked clinical and roentgenologic signs. The end result of pneumonia due to the Friedländer bacillus, both clinically and roentgenologically, almost completely simulates chronic pulmonary tuberculosis in that it produces cavitation, displacement of the trachea, elevation of the domes of the diaphragm and elevation of the hili of the lungs.

Raynaud's Disease in Association with Sclerodactylia.—Prinzmetal states that sclerodactylia and scleroderma are often associated with Raynaud's disease. Most frequently the changes in the skin occur after the vasospastic syndrome has been present for some time. Sclerodactylia occasionally occurs without pathologic arterial spasm and in some cases may precede the attacks of local asphyxia of the fingers. Occasionally the changes in the skin and the vasospastic attacks in the fingers begin simultaneously. The author demonstrates that Raynaud's syndrome in association with sclerodactylia has a more severe clinical course and presents a more difficult therapeutic problem than uncomplicated Raynaud's disease, and the experimental vascular reactions differ in the two conditions. Important causal factors in sclerodactylia are the tight, inelastic skin and subcutaneous tissue of the fingers, which constrict the blood vessels and diminish the blood flow. In sclerodactylia the areas of greatest circulatory insufficiency coincide with the areas of greatest change in the skin. Determinations of the temperature of the skin verify this contention. The atrophy of the terminal phalanx in sclerodactylia is probably due to pressure of the tight skin. Whereas sympathectomy raises the temperature of the normal skin and the temperature of the skin of patients with uncomplicated Raynaud's syndrome, little or no rise in temperature takes place if severe sclerodactylia is present, and no clinical improvement follows. It was demonstrated in one

case that, if the tight skin of the finger tip is relaxed, slight but definite improvement in circulation, as determined by the color and temperature of the skin, takes place. If a binding of about the same degree of tightness as that present in sclerodactylia is placed on a normal finger, the abnormal vascular reactions found in sclerodactylia may be duplicated. Vasodilator impulses induced by the Landis heat test for arterial occlusion cause little or no increase in the temperature of the skin in sclerodactylia. Similarly, if a normal finger is bound, little or no rise in temperature takes place. A simple test for arterial occlusion may be performed by the injection of histamine into the terminal phalanx of the finger or toe to be tested. If no organic occlusion is present, the temperature of the skin rises in a short time. In cases of severe sclerodactylia, no rise in temperature takes place after the injection of histamine. If the normal finger is bound, similar results are obtained. The use of intermittent suction, recommended by Herrmann and Landis, may cause an increase in circulation in cases of sclerodactylia, as determined by the temperature and color of the skin, though sympathectomy has failed to produce improvement. It is suggested that the mechanism of improvement is the relaxation of the tight skin. This seems to be the only method available at present which may prove beneficial.

Archives of Ophthalmology, Chicago

16: 173-340 (Aug.) 1936

Diathermic Treatment of Giant Holes in Retina. H. Weve, Utrecht, Netherlands.—p. 173.
Medullated Optic Nerve Fibers Accompanying Oxycephaly and Other Cranial Deformities. M. M. Abeles, New York.—p. 188.
William Porterfield, M.D.: An Almost Forgotten Opticophysiologist. B. Chance, Philadelphia.—p. 197.
Peripheral Vision in Art. L. Mills, Los Angeles.—p. 208.
Roentgen Treatment for Disease of the Eye. S. de Grósz, Budapest, Hungary.—p. 220.
Cyst of Vitreous Attached to Retina: Report of Case. L. H. Schwartz, New York.—p. 230.
Relationship of Sinusitis to Optic and Retrobulbar Neuritis, with Especial Reference to Etiology and Treatment. E. H. Campbell, Philadelphia.—p. 236.
Biochemistry of Lens: VIII. New Proof of Presence of Vitamin C in Crystalline Lens. J. Bellows and L. Rosner, Chicago.—p. 248.
Conjunctivitis Due to Fusospirochetal Infection. J. H. Dunnington and Devorah Khorazo, New York.—p. 252.
Myopia and Orbital Congestion. H. Lipschutz, London, England.—p. 255.
Corneal Dystrophy in Three Generations with Genealogical Chart. M. Freiberger, New York.—p. 257.
Phospholipid Content of Cataractous and Sclerosed Human Lenses: Biochemical Study of Lenticular Changes. P. W. Salit, Iowa City.—p. 271.
The Spectacle Industry. J. E. Lebensohn, Chicago.—p. 284.

Arch. of Physical Therapy, X-Ray, Radium, Chicago

17: 385-480 (July) 1936

Temperature of Skin Surface. W. Bierman, New York.—p. 393.
Low Voltage Currents. F. Nagelschmidt, London, England.—p. 404.
*Influence of Short Wave Radiation on Constituents of Blood. D. Kobak, Chicago.—p. 413.
Unusual Complication of Treatment by Hyperthermy. I. D. Stein, Mount Vernon, N. Y.—p. 419.
Temperature Elevations During Pelvic Short or Ultrashort Wave Treatment. E. A. Horowitz, S. Gottesman, D. Derow and M. Schwarzschild, New York.—p. 422.
Clinical Comparison Between Diathermy and Short Wave Diathermy. R. Kovacs, New York.—p. 432.
Modern Technic in Hydrotherapy. H. J. Behrend, New York.—p. 436.

Short Wave Radiation and Blood.—On the basis of an investigation of the action of short waves on the constituents of the blood, Kobak arrives at the following conclusions: 1. Short wave therapy apparently influences the various constituents of the blood. 2. Minimal dosage of short wave radiation tends to raise the refractometric index, increase the viscosity, raise and lower the blood sugar, and increase the sedimentation rate. 3. The changes produced are significant of the internal influence only of short waves and require more detailed correlation on actual clinical material. 4. The applicability of the experimental data to therapy is clearly indicated by their biophysical and biochemical character, the ultrashort regions having a more selective action and a more prolonged heating effect than is found in the longer regions of short wave diathermy.

Colorado Medicine, Denver

33: 521-592 (Aug.) 1936

The Colorado Medical Foundation Is Now a Fact. H. T. Sethman, Denver.—p. 534.
Diagnosis of Cancer of Lung. C. O. Giese, Colorado Springs.—p. 537.
Diagnosis and Treatment of Traumatic Injuries of Intra-Abdominal Viscera. J. B. Farley, Pueblo.—p. 543.
Nursing Education and the Hospital. A. C. Bachmeyer, Chicago.—p. 562.

Florida Medical Association Journal, Jacksonville

23: 61-112 (Aug.) 1936

Collapse Therapy of Pulmonary Tuberculosis. L. Limbaugh, Jacksonville.—p. 73.
The Surgery of Pulmonary Tuberculosis. K. A. Morris, Jacksonville.—p. 74.
Moving Picture Demonstration of X-Ray Films. W. M. Shaw, Jacksonville.—p. 77.
Control of Syphilis, with Especial Emphasis on Adequate Treatment as a Control Measure. R. A. Vonderlehr, Washington, D. C.—p. 78.
*Chronic Cervicitis. C. D. Hoffmann, Orlando.—p. 81.
Endometriosis. I. M. Hay, Melbourne.—p. 83.
Medical Days with Legal Shadows. Carol C. Webb and F. C. Mellen, Pensacola.—p. 85.
Lobectomy with Recovery: Report of Case. L. W. Martin, Sebring.—p. 90.

Chronic Cervicitis.—Hoffmann says that, in any treatment for chronic cervicitis with erosion, eversion or laceration, one must bear in mind the histopathology of the condition; that is, the malarrangement of the columnar and squamous epithelium. Whatever line of treatment is adopted, success will not be reached until the pathologic condition is corrected and the underlying and superficial tissues are restored to their normal arrangements and cell layers. Among the plans of treatment are (1) the various chemical applications with or without tamponage, (2) electrical cauterizations, (3) coagulations, (4) radium, (5) surgical and, last but not least, the Crossen conization with the cutting electrode. The author evaluates these different methods and states that at his hospital conization with the Crossen loop has been done with good success. The technic is that used in the Hyams loop but has the distinct advantage over the Hyams loop of accomplishing in one revolution what would take many revolutions for the Hyams loop. The operation with the Crossen loop requires less than one minute and gives a cleanly coned out operative field. It is very unusual for any free bleeding to occur and rarely, if ever, are sutures required. If the conization is properly done and the current is not too hot, little scar tissue is encountered. The author dilates the cervix to about twice its size before conization. He feels that in this way the infected tissue is packed together, the extra edema is pushed out of the tissue and there is not the danger of taking out more than the desired amount of normal tissue at the base of the infected tissue. Other advantages of the conization method besides the assurance of getting the diseased tissue and the reduced amount of cicatricial tissue postoperatively are that it is an ideal method of removing tissue for biopsy, the hospitalization is from thirty-six to seventy-two hours, and there is little loss of blood and no shock to the patient. The author observed more than 200 of these cases all the way from operation through the various stages of healing. Ordinarily the slough has completely gone in from seven to ten days, leaving a clean nonirritated cervix. The cervix at the end of three weeks presents the clean regular appearance of the nulliparous cervix.

Johns Hopkins Hospital Bulletin, Baltimore

59: 1-72 (July) 1936

*Mortality in Tuberculin-Positive Infants. Miriam Brailey, Baltimore.—p. 1.
Influence of Adrenal Cortex on Distribution of Body Water. G. A. Harrop, Baltimore.—p. 11.
Water and Salt Hormone of Adrenal Cortex. G. A. Harrop, Baltimore.—p. 25.
Surgical Treatment of Gastric and Duodenal Ulcers. I. R. Trimble and D. L. Reeves, Baltimore.—p. 35.

Mortality in Tuberculin-Positive Infants. — Brailey reports that 170 children, of whom seventy-two were white and ninety-eight colored, found to be infected with tuberculosis before reaching 2 years of age, were kept under observation for periods ranging from one to five years. They can be divided into sixty-seven who showed parenchymal involvement of the

lungs at initial roentgenoscopy and 103 who showed no definite parenchymal lesion when first examined. Twenty-two, roughly one third of those with a pulmonary lesion when the infection was discovered, were ill and presented signs of disease such that a diagnosis could usually have been made by ordinary clinical means. The remaining patients gave no indication of their infection, and a diagnosis could not have been made without the tuberculin reaction and the use of roentgen examination. By calculation, following actuarial procedures, the total five-year mortality for white children was found to be 13 per cent and for the colored children 31 per cent. Approximately 70 per cent of the deaths that occurred in five years of observation fell within the first year, mostly within the first six months following the discovery of the infection. This refers to deaths from all causes, but, with few exceptions, tuberculosis was the immediate cause of death. Of those admitted with involvement of the lung parenchyma, 31 per cent were dead within the first year of observation, no difference being observed between the two races in case fatality. Among those whose initial chest plates showed no parenchymal involvement, mortality during the first year subsequent to the discovery of infection was 6.8 per cent. No deaths occurred among the forty-nine white children of this group, but there were seven deaths among fifty-four colored children. In the entire group of colored children observed, mortality has been more than twice that observed in white children. When the pulmonary lesion has developed sufficiently to be readily demonstrable by roentgen ray, the fatality is about the same in white as in colored children. However, lesions of this extent are much more frequent in the colored than in the white, and this appears to account for the fact that the gross mortality in the colored is so much higher. In both white and colored children, mortality has been more than twice as high in those known to be infected during the first six months of life as in those whose infection was discovered between the ages of 6 months and 2 years. In about 78 per cent of the white and 64 per cent of the colored children of this study there was intrafamilial contact with a proved sputum-positive case. The children of each race with known exposure showed a slightly higher mortality than children not known to have been exposed. The difference in mortality is not statistically significant and a detailed study of a larger series must be made to determine the bearing which continued exposure may have on severity of lesion.

Journal of Experimental Medicine, New York

64: 161-332 (Aug. 1) 1936

Quantitative Studies on Antibody Purification: I. The Dissociation of Precipitates Formed by Pneumococcus Specific Polysaccharides and Homologous Antibodies. M. Heidelberger and F. E. Kendall, New York.—p. 161.

Survival of Virus of Poliomyelitis in Oral and Nasal Secretion of Convalescents. S. D. Kramer, A. E. Sobel, L. H. Grossman and B. Hoskwith, New York.—p. 173.

Epidemiology of Lymphocytic Choriomeningitis in White Mice. E. Traub, Princeton, N. J.—p. 183.

Complement Fixation Reaction with Pneumococcus Capsular Polysaccharide. K. Goodner and F. L. Horsfall Jr., New York.—p. 201.

Active Immunization of Guinea-Pigs with Virus of Equine Encephalomyelitis: III. Quantitative Studies of Serum Antiviral Bodies in Animals Immunized with Active and Inactive Virus. H. R. Cox and P. K. Olitsky, New York.—p. 217.

Id.: IV. Effect of Immune Serum on Antigenicity of Active and Inactive Virus. H. R. Cox and P. K. Olitsky, New York.—p. 223.

Studies on Suprarenal Cortex: V. Influence of Cortical Hormone on Excretion of Water and Electrolytes in Suprarenalectomized Dog. G. A. Harrop, W. M. Nicholson and Margaret Strauss, Baltimore.—p. 233.

Changes in Outlying Bone Marrow Accompanying Local Increase of Temperature Within Physiologic Limits. C. Huggins and B. H. Blocksom Jr., Chicago.—p. 253.

Increase in Reticulo-Endothelial Cells in Outlying Bone Marrow Consequent on Local Increase in Temperature. C. Huggins and W. J. Noonan, Chicago.—p. 275.

Studies on Natural Immunity to Pneumococcus Type III: II. Certain Distinguishing Properties of Two Strains of Pneumococcus Type III Varying in Their Virulence for Rabbits, and Reappearance of These Properties Following R → S Reconversion of Their Respective Rough Derivatives. M. F. Shaffer, J. F. Enders and C-J. Wu, Boston.—p. 281.

Id.: III. Correlation of Behavior in Vivo of Pneumococci Type III Varying in Their Virulence for Rabbits with Certain Differences Observed in Vitro. J. F. Enders, M. F. Shaffer and C-J. Wu, Boston.—p. 307.

Journal of Immunology, Baltimore

31: 1-58 (July) 1936

Reticulo-Endothelial System and Anaphylaxis in Dog. M. A. Mills and C. A. Dragstedt, with assistance of F. B. Mead, Chicago.—p. 1.

Permeability of Lungs to Antibodies. J. P. Fox, Chicago.—p. 7.

Group Specific Agglutinins in Rabbit Serums for Human Cells: I. Normal Group Specific Agglutinins. C. A. Stuart, P. B. Sawin, K. M. Wheeler and Shirley Battey, Providence, R. I.—p. 25.

Id.: II. Immune Group Specific A Agglutinins. C. A. Stuart, P. B. Sawin, A. M. Griffin and K. M. Wheeler, Providence, R. I.—p. 31.

Hemolytic and Combining Capacities of Pneumococcic Extracts. Winifred S. Hull, New Haven, Conn.—p. 37.

Comparison of Bactericidal Action of Human and Guinea-Pig Blood on Strains of Meningococcus with Mouse Mucin Test for Virulence. N. Silverthorne and D. T. Fraser, Toronto.—p. 43.

*Behavior of Immediate and Delayed Cutaneous Reactions to Bacterial Nucleoproteins in Asthmatic Patients. F. A. Stevens and L. Jordani, New York.—p. 51.

Cutaneous Reactions in Asthmatic Patients.—Stevens and Jordani prepared from broth cultures the nucleoproteins used for intracutaneous testing. All the patients studied had asthma. Some were sensitive and others nonsensitive to the common allergens. Tests were first done with the nucleoproteins of the hemolytic streptococcus, Streptococcus viridans, Micrococcus catarrhalis, the influenza bacillus and Staphylococcus aureus. Subsequently some of the patients were tested only with the proteins with which positive reactions had been obtained previously. All the nucleoproteins elicited both immediate and delayed reactions. The immediate reactions may have been due to traces of carbohydrates. This possibility is mentioned because immediate reactions have been evoked by intracutaneous injections of the specific carbohydrates of pneumococci and staphylococci in patients infected with these bacteria. The immediate and delayed reactions to the hemolytic streptococcus, the influenza bacillus and Streptococcus viridans were usually transient, although in a few instances delayed reactions continued positive for several months. The immediate reactions to staphylococcus and the delayed reactions to Micrococcus catarrhalis were usually of the persistent type. The persistence of these two reactions accounts in part for the high percentage of immediate reactions to the staphylococcus and of delayed reactions to Micrococcus catarrhalis when patients are tested consecutively with a number of bacteria among which these two kinds are included. The observation that both immediate and delayed reactions seldom occur at one site of inoculation with a nucleoprotein has been confirmed in the present study. Whereas sixty-three immediate reactions and fifty-three delayed reactions occurred independently of one another, in only six instances were wheals followed by delayed, tuberculin-like reactions. This observation may now be extended with the statement that usually, when an immediate reaction is obtained with a bacterial nucleoprotein, in later tests the patient tends to react in the same manner. Immediate reactions are followed by immediate reactions on subsequent retesting, and delayed by delayed reactions; the patient may, however, give an immediate response to one bacterium and a delayed reaction to another synchronously injected. Most reactions have varied in intensity in the course of time. A definite tendency exists on the part of the patient to react habitually to a bacterial nucleoprotein as he has reacted in the past. Attention should be directed to the parallelism between these recurrent reactions of similar type and acute exacerbations occurring in the course of certain chronic diseases. Two examples may be given. In rheumatic fever, pharyngeal reinfection with hemolytic streptococci is followed commonly by recurrence of the rheumatic syndrome. In asthma caused by infection, upper respiratory infections are usually followed by a recurrence of the asthmatic symptoms.

Maine Medical Journal, Portland

27: 155-174 (Aug.) 1936

More Recent Developments in Diabetic Treatment. E. R. Blaisdell, Portland.—p. 155.

Hematuria. C. E. Blaisdell, Bangor.—p. 158.

Death Due to Phenol Absorption Through Unbroken Skin: Review of Literature with Case Report and Autopsy. J. Gottlieb, Lewiston, and E. Storey, Columbus, Ga.—p. 161.

Poliomyelitis. G. H. Coombs, Augusta.—p. 165.

Services for Maternal and Child Health and for Crippled Children Under Social Security Act. Doris A. Murray, Washington, D. C.—p. 165.

Missouri State Medical Assn. Journal, St. Louis

33: 303-338 (Aug.) 1936

Treatment of Arthritis with Mecholyl Iontophoresis: Report of Cases. G. H. Mathae, St. Louis.—p. 303.
Olivopontocerebellar Atrophy: Case Presentation. A. L. Skoog, Kansas City.—p. 317.
Production of Prolonged Stimulation of Sympathetic Nerve Trunk; After Method of Burrows. J. H. Hershey, St. Louis.—p. 320.
Problems of the Female Urethra. E. E. Sexton, St. Louis.—p. 323.
Ten Year Mortality Study in Toxic Goiter. W. Bartlett Jr., St. Louis. —p. 326.

New England Journal of Medicine, Boston

215: 177-222 (July 30) 1936

Allergy to Aminopyrine: Blood Studies Following Anaphylactic-like Shock in a Patient. M. B. Strauss, Boston.—p. 177.
Physical Examination of Children: Note. F. C. McDonald, Boston.—p. 189.
Methylene Blue Therapy in Nitrobenzene Poisoning: Case Report. H. D. Leinoff, New York.—p. 191.
Congenital Patent Urachus. P. J. Mahoney, Boston, and D. Ennis, Rochester, N. Y.—p. 193.
Acute Anal Pain from Obscure Abscesses: Their Diagnosis and Treatment. N. D. Smith, Rochester, Minn.—p. 195.

215: 223-264 (Aug. 6) 1936

Studies in Asthma: XIX. Nose and Throat in Five Hundred Cases of Asthma. F. L. Weille, Boston.—p. 235.
*Factors Influencing Development of Tuberculous Infection in Childhood. A. S. Johnson, Springfield, Mass.—p. 239.
Progress in Treatment and Diagnosis of Syphilis, 1935. A. W. Cheever, Boston.—p. 242.

Tuberculous Infection in Childhood.—This study was undertaken by Johnson in an attempt to evaluate some of the factors supposed to influence the development of tuberculous infection in children. The group in question comprised 375 children under 16 years of age who were examined at the Health Department Tuberculosis Dispensary in Springfield. Two hundred and eighteen children gave a definite history of contact with a known case of pulmonary tuberculosis; 157 noncontacts were presented for examination because of malnutrition, recurrent respiratory infections, or vague apprehension on the part of the parent. The examination of each child included a record of the age, sex, height, weight, temperature, cutaneous tuberculin reaction after forty-eight hours, roentgen examination of the chest, source of contact, period of exposure, and an appraisal of domestic hygiene as a result of personal investigation of the home. On the basis of these studies the author reaches the conclusion that close and persistent association with a case of pulmonary tuberculosis, especially one with a positive sputum, appears to be the most important predisposing factor in the development of tuberculous infection in children. It has not been possible to demonstrate that the age, sex or nutrition of the child, the source of contagion, or the sanitary conditions in the home play an important part in conditioning tuberculous infection in the child.

New Orleans Medical and Surgical Journal

89: 57-110 (Aug.) 1936

Auricular Fibrillation. M. D. Hargrove, Shreveport, La.—p. 57.
Coronary Occlusion. M. W. Hunter, Monroe, La.—p. 62.
Factors Influencing Morbidity and Mortality in Benign Tertian and Estivo-Autumnal Malaria. M. Shushan and O. Blitz, New Orleans. —p. 66.
*Roentgen Ray Treatment of Hay Fever. S. Hatchette, Lake Charles, Ind.—p. 70.
Inquiry as to Nature of Chronic Appendicitis. A. R. Hertzler, Halstead, Kan.—p. 73.
Operation of the Oscar Allen Tumor Clinic. J. T. Nix, New Orleans. —p. 75.
Contemporary Medicine and the "Soul." M. M. Black, New Orleans. —p. 78.
The United States Pharmacopeia. O. W. Bethea, New Orleans.—p. 81.
Bacteriophage in Respiratory Disease. H. Hosen and J. Signorelli, New Orleans.—p. 83.
Painful Feet. T. M. Oxford, Shreveport, La.—p. 86.

Roentgen Treatment of Hay Fever.—Hatchette used roentgen treatment in sixteen cases of hay fever, employing 100 kilovolts, 3 milliamperes, 2 mm. of aluminum filtration and a field of 10 by 10 cm. Irradiation was given over the region of the nose, the rays being directed slightly caudad in an effort to avoid direct irradiation of the pituitary. The eyes of all patients were protected by lead foil as soon as the first symptoms of improvement here were noted, and no patient received more than three irradiations without protection over the orbits. No other form of treatment was used by any patient during the course of irradiation. Two of the patients were suffering from asthma during the course of treatment and failed to respond to the roentgen rays. One patient failed to return after the second treatment and no results were obtained. One patient failed to show any response from a light year-round hay fever but was apparently completely relieved from her "autumnal" type. The remaining twelve patients obtained complete relief from their symptoms following completion of their treatments and until the first frost, when nature automatically ended their hay fever season.

Ohio State Medical Journal, Columbus

32: 701-796 (Aug. 1) 1936

*Cardiac Asthma. A. C. Ernstene and R. S. Knowlton, Cleveland. —p. 717.
Acute Appendicitis with Perforation: Analysis of 261 Cases of Ruptured Appendix. A. T. Bowers, Dayton.—p. 722.
Warwick Ionization Treatment for Hay Fever and Hyperesthetic Rhinitis with Further Report on Cases. B. L. Bryant, Cincinnati. —p. 726.
Treatment of Infantile Eczema. L. H. Dembo, Cleveland.—p. 732.
Surgical Management of Intracranial Meningioma. W. J. Gardner, Cleveland.—p. 737.
Neuromyelitis Optica. C. E. Kiely, Cincinnati.—p. 740.
Professional Education in Relation to Modern Public Health. A. Friedlander, Cincinnati.—p. 742.
Hemochromatosis: Report of Case. E. W. Miskall, East Liverpool. —p. 746.
Spinal Anesthesia for Rectal and Perineal Surgery. G. N. Wenger, Massillon.—p. 747.
Influenza: Comparative Study of Different Forms of Treatment. A. M. Glazer, Cincinnati.—p. 749.
Removal of Foreign Body from Rectum. J. B. Beeson, Wooster. —p. 750.

Cardiac Asthma.—According to Ernstene and Knowlton, cardiac asthma usually is due to sudden failure of the left ventricle, which has been damaged previously as the result of hypertension, coronary artery sclerosis or aortic valve disease. In a small group of patients with uncomplicated mitral stenosis, similar attacks occur as the result of factors that increase the heart rate. When the heart rate is sufficiently accelerated, the right ventricle expels blood into the pulmonary vessels more rapidly than it can pass through the narrowed mitral orifice, and acute pulmonary congestion develops. Cardiac asthma due to left ventricular failure usually develops after the age of 50 years, while the form due to uncomplicated mitral stenosis generally occurs in younger persons. The prognosis is poorer in the first group than in the second. In a series of forty consecutive cases of cardiac asthma on which the authors base this report, the attacks were due to failure of the left ventricle in thirty-five and to the presence of uncomplicated mitral stenosis in three. Mitral stenosis was complicated by aortic insufficiency and hypertension respectively in two patients, and the exact mechanism of the attacks could not be determined. The two most effective measures in the treatment of attacks of cardiac asthma are morphine and the upright position. Morphine should be administered hypodermically as early in the attack as possible, usually in doses of one-fourth grain (0.016 Gm.) and should be repeated if the patient does not appear to be improved within fifteen or twenty minutes. Cardiac asthma is attended characteristically by orthopnea. It is probable that the increase in vital capacity that accompanies the change from the recumbent to the erect posture contributes importantly to the relief experienced in the latter position. In patients with cardiac asthma due to failure of the left ventricle, morphine and the upright position may at times fail to relieve the patient sufficiently. In the absence of anemia, venesection should be carried out with the removal of from 250 to 500 cc. of blood. If cardiac asthma progresses to acute pulmonary edema in spite of the administration of morphine and venesection, either strophanthin or digitalis should be given intravenously. Occasionally, cardiac asthma may be relieved by the administration of glyceryl trinitrate, particularly in patients with severe hypertension. A patient who has experienced an attack of cardiac asthma due to failure of the left ventricle should be treated as any other individual who presents evidence of impaired myocardial reserve. In those who have suffered more severe attacks, a period of absolute rest is advisable and should be followed by strict limitation of activity. Restriction of fluids and the administration of diuretic drugs also are valuable measures. In patients with cardiac asthma due to

uncomplicated mitral stenosis it is of great importance to avoid exertion and emotional upsets. Sedatives should be given in daily divided doses to those patients who display evidence of emotional instability.

Psychiatric Quarterly, Albany, N. Y.

10: 365-528 (July) 1936

Tuberous Sclerosis: Diffuse Neurospongioblastosis. A. Ferraro and G. J. Doolittle, New York.—p. 365.
Simulated Foolishness and Mental Puerilism in Psychoses. P. Milici, Kings Park, N. Y.—p. 417.
Report of Treatment of Severe Case of Pellagra and Alcoholism with Recovery. M. M. Harris, P. P. Poliak and J. R. Blalock, New York.—p. 438.
Treatment of Prepsychotic Personalities of Schizoid and Cycloid Types. A. J. Gosline, Utica, N. Y.—p. 454.
Psychoses Associated with Hyperthyroidism. G. R. Jameison and J. H. Wall, White Plains, N. Y.—p. 464.
Relationship of Posttraumatic Central Nervous System Pathology to Clinical Psychiatric Syndrome. O. J. McKendree, Utica, N. Y.—p. 481.
Hereditary and Environmental Factors in Causation of Dementia Praecox and Manic-Depressive Psychoses. H. M. Pollock, B. Malzberg and R. G. Fuller, Albany, N. Y.—p. 495.

Public Health Reports, Washington, D. C.

51: 947-988 (July 17) 1936

Important Causes of Sickness and Death. R. H. Britten.—p. 947.
Malaria Control Activities of Tennessee Valley Authority. E. L. Bishop.—p. 970.
Rat-Bite Fever Spirochetes in Naturally Infected White Mice, Mus Musculus. E. Francis.—p. 976.

Surgery, Gynecology and Obstetrics, Chicago

63: 129-272 (Aug.) 1936

Measurement of Harmfulness of Dusts for Humans Through Agency of Animal Reactions, with Especial Reference to Lesions Produced by Silica as Basis of Comparison. C. P. McCord, Cincinnati; R. L. Fleming, Harriet Ainslee and J. Johnston, Detroit.—p. 129.
Response of Mammary Gland to Prolonged Stimulation with Ovarian Hormones. I. G. MacDonald, Cornwall, N. Y.—p. 138.
Effects of Administration of Thorium Dioxide. A. J. Fleming and W. H. Chase, Montreal.—p. 145.
Vascularity of Benign and Malignant Lesions of Stomach: Comparative Study with Clinical Correlations. N. W. Thiessen, Rochester, Minn.—p. 149.
Biliary Duodenal Intubation. R. Colp, New York.—p. 157.
*When to Remove Drainage Tube in Common Bile Duct Drainage. R. F. Carter, New York.—p. 163.
*Ovarian Function and Occurrence of Menopausal Symptoms Following Hysterectomy. R. Marx, H. R. Catchpole and B. J. McKennon, Los Angeles.—p. 170.
Technic for Simultaneous Exposure and Operation on Adrenals. H. H. Young, Baltimore.—p. 179.
Technic of Gastric Resection for Carcinoma: Critical Review. G. T. Pack and Isabel M. Scharnagel, New York.—p. 189.
Repair of Rupture of Male Urethra: Report of Eight Injuries from Falling Astride a Manhole Cover. V. J. O'Conor, Chicago.—p. 198.
Injection Treatment of Hernia. F. I. Harris and A. S. White, San Francisco.—p. 201.
Prophylaxis in Gynecology, with Especial Reference to Immediate Care of Postpartum Cervix. B. H. Goff, New York.—p. 212.
*Squamous Cell Epithelioma of Extremities. P. J. DeBell, Passaic, N. J., and T. D. Stevenson, Canton, China.—p. 222.
Precaution in Stab Wound Colostomy. G. W. Taylor, Boston.—p. 230.
Sudden Occlusion of Arteries of Extremities: Study of 100 Cases of Embolism and Thrombosis. R. E. McKechnie and E. V. Allen, Rochester, Minn.—p. 231.
Pelvic Abscess in Women: Complications and Management, with Study of 328 Cases. D. R. Jensen, New York.—p. 241.

Common Bile Duct Drainage.—Carter shows that surgical drainage of the common bile duct is generally advocated for stones, cholangeitis, pancreatitis and cholangeitis with chronic fibrosis of the duct. The advisability of introducing a tube into the common duct is not taken up by the author, but rather the methods in use to determine that the goal of drainage has been reached. The relief of obstruction by drainage can be determined to have been accomplished when the sphincter of Oddi responds to the food test. Clamping the tube to determine the state of the sphincter of Oddi is not a necessary procedure. The presence of pus in the biliary drainage may be taken as the period of active inflammation within the duct. Daily cultures of the biliary drainage are not reliable in determining the necessary drainage period. Sedimentation of bile with crystalline formation, especially of calcium bilirubinate, should cease before the tube is withdrawn. Pancreatic ferments in the biliary drainage contraindicate removal of the tube before the sphincter of Oddi has been definitely restored to normal, as shown by the food test. Daily bile salt determination of the biliary drainage, as has been previously determined, is a distinct aid in treating liver failure in patients with a badly damaged hepatic system the result of obstruction and infection. Prolonged drainage of the common duct does not seem to be essential in most cases to meet the requirements for which drainage was instituted. Careful analysis of the biliary drainage and response of the sphincter of Oddi are essential in determining the time of drainage necessary. A careful analysis of the case during the postoperative period, with special attention to the function of the sphincter of Oddi, to the chemistry of the bile and to microscopic study for crystalline sediment and pancreatic ferment determination, is of great importance in the administration of specific postoperative medical therapy. Earlier removal of the common duct drainage tube may be possible when specific postoperative medical therapy is instituted and carried out.

Ovarian Function and Menopausal Symptoms Following Hysterectomy.—Marx and his collaborators investigated twenty-one cases in which total or supravaginal hysterectomy had been performed with as much ovarian tissue preserved as seemed advisable. In one case which showed good estrogenic output only a part of one cystic ovary had been preserved. In the majority of the cases four assays were made for estrogenic substance at weekly intervals and two or more estimations for the follicle-stimulating factor were made. They conclude that there is a striking contrast between the hormone picture and occurrence of "hot flushes" following total hysterectomy and supravaginal hysterectomy. The clinical symptoms of the menopause appear earlier and more marked after total hysterectomy than after supravaginal hysterectomy. The preservation of even a small part of the uterus seems to have a retarding and mitigating effect on the appearance of retrogressive changes in the pituitary-ovarian function and the occurrence of menopausal symptoms. The studies seem to support the theory that the uterus elaborates a catalytic principle acting on some part of the pituitary-ovarian hormone mechanism, regulating its normal balance and functional harmony. The amount of output of estrogenic substance after hysterectomy is determined more by the biologic quality than by the amount of ovarian tissue retained. Occurrence of "hot flushes" after hysterectomy is associated in nearly every instance with an increase of gonadotropic substance and in the majority of cases with a decrease of estrogenic substance. In a few cases manifesting "hot flushes," average amounts of estrogenic substance and in rare instances normal gonadotropic substance may be found. On the other hand, diminution or even complete absence of estrogenic substance and increase of gonadotropic substance, occurring independently or together, are not necessarily associated with "hot flushes."

Squamous Cell Epithelioma of Extremities.—DeBell and Stevenson point out that considerable difference of opinion exists regarding the proper treatment of squamous cell epithelioma of the skin. At the Stuyvesant Square Hospital this type of cancer has been treated by surgical removal. The authors discuss sixty-one cases of the upper and lower extremities treated in this manner. Fifty-one were on the upper limb and ten on the lower. The authors reach the following conclusions: 1. Squamous cell epithelioma is not a common type of tumor. 2. Squamous cell epithelioma is found chiefly in those of the cancer age. 3. Because of the predisposing factors, this type of tumor is more common in men. 4. By far the greatest number, forty-three, appeared on the dorsum of the hand. 5. The majority are of grade 1, histologically. 6. Duration of the lesion seems to have no relationship to metastasis. 7. Metastases to regional lymph nodes were found only in cases with larger lesions, the smallest being 3 by 3.5 cm. in diameter. 8. All lymph nodes showing metastases were palpable before operation. 9. Dissection of the epitrochlear lymph nodes should be considered if the lesion extends over the ulnar aspect of the hand. 10. Routine dissection of regional nodes in cases of epithelioma originating in burn scars is advocated. 11. Dissection of regional nodes should be performed in recurrent cases. 12. Although the number of cases of epithelioma on the lower extremities is not large, it appears that these are more likely to metastasize than lesions on the upper extremities. 13. There were no cases with generalized metastases. 14. Surgical removal is a satisfactory method of treatment.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Dermatology and Syphilis, London

48: 337-398 (July) 1936

Kaposi's Varicelliform Eruption: Epidemic of Sixteen Cases. A. D. McLachlan and Marjorie Gillespie.—p. 337.
Schaumann's Disease (Benign Lymphogranulomatosis): Account of Case. C. H. Whittle.—p. 356.
Note on Multiple Eruptive Xanthoma in Infants: Naevoxantho-Endothelioma (McDonagh). H. G. Adamson.—p. 366.
Case of Pemphigus Vegetans, with Investigations, and Effect of Treatment on It. K. C. Bailey.—p. 370.

British Journal of Ophthalmology, London

20: 385-448 (July) 1936

Use of Flicker Phenomenon in Investigation of the Field of Vision. L. A. Riddell.—p. 385.
Retrotransilluminator. J. G. Clegg.—p. 410.
Kinescopy: Objective and Subjective (Supplementary Remarks): S. Holth.—p. 412.
First Radius Figure for Subjective Astigmometry. S. Holth.—p. 415.
Cod Liver Oil as Local Treatment for External Affections of the Eyes. E. Stevenson.—p. 416.
Tattooing of Corneal Opacity with Gold and Platinum Chloride. J. N. Duggan and B. P. Nanavati.—p. 419.

British Journal of Tuberculosis, London

30: 109-180 (July) 1936

The Psychology of the Tuberculous. C. G. Learoyd.—p. 111.
Bronchospirometry. H. C. Jacobaeus.—p. 114.
Sources of Infection in Primary Tuberculosis of Childhood. C. H. C. Toussaint and E. J. MacIntyre.—p. 125.
*Climate and Tuberculosis. A. Morland.—p. 142.
"Tomography": Report on Method of X-Raying Sections of Body. J. W. Craig.—p. 152.
*Relief of Laryngeal Pain. L. B. Stott.—p. 155.

Climate and Tuberculosis.—According to Morland, climate appears to have less influence on tuberculosis mortality than such factors as racial immunity and social conditions; there is none the less some evidence that warm, damp climates are associated with a relatively high tuberculosis mortality. Climatic stimulation has a definite place in the treatment of tuberculosis, but care must be taken not to expose to a highly stimulating climate patients whose powers of response are inadequate. In the selection of cases careful individualization is necessary; dyspnea from diminished vital capacity, cardiac arrhythmia and nervous instability all tend to be increased with rise in altitude. No air in the world can make up for the absence of medical guidance and discipline which a well conducted sanatorium provides. With some exceptions, cases with symptoms of activity are best treated in the first place at a low or moderate altitude; selected cases with adequate powers of response should subsequently be sent to higher altitudes. More sedative climates of the Mediterranean type are suitable for patients with bronchitis and emphysema with little or no tuberculous activity.

Relief of Laryngeal Pain.—Stott points out that the practice of blocking the internal branch of the superior laryngeal nerve, introduced by Hoffman in 1908, still retains its popularity as a method of giving relief in dysphagia. It does not, however, relieve the agonizing pain that shoots from the pharynx to the ear during the act of swallowing. This pain is described by nearly all patients with a tuberculous lesion in the larynx, and the attitude of the victim who places his forefinger over the temporal artery and his thumb under the angle of the jaw while he regards a bowl of cold gruel is familiar to every tuberculosis worker. The normal consummation of the reflex of swallowing is prevented, and the obstructed action of the stylohyoid muscle is apparently responsible for the characteristic shooting pain in the ear. Six nerves—the fifth, seventh, ninth, tenth, eleventh and twelfth—all take their part in the act of swallowing, and therefore it is a matter for little surprise that the blocking of one branch of the tenth fails to relieve pain during swallowing, though it does anesthetize satisfactorily the laryngeal mucosa. The mylohyoid nerve, however, is accessible at its point of division from the inferior dental nerve, as it enters the mandibular foramen behind the projection of the lingula. The terminal branch of the facial nerve to the inferior edge of the posterior belly of the digastric muscle is also of easy access, as the anatomic relations of the digastric muscles and its attachments to the hyoid bone have definite surface markings. Thus it is possible to block the branches of three cranial nerves to the parts concerned, leaving the ninth, eleventh and twelfth unaffected. That is to say, by infiltrating the neighborhood of the posterior belly of the digastric muscle with a local anesthetic and at the same time blocking the mylohyoid nerve and the internal branch of the superior laryngeal nerve on both sides, it is possible to render the act of deglutition painless without interfering with mastication or the movement of swallowing, even though occasional unavoidable blocking of the inferior dental nerve produces anesthesia of the lower lip.

British Medical Journal, London

2: 57-108 (July 11) 1936

Epidemic Poliomyelitis: Epidemiology, Causes and Prevention. A. S. MacNalty.—p. 57.
Brain Size and Mentality. R. J. A. Berry.—p. 62.
*Mirror Test in Pulmonary Tuberculosis. R. C. Cohen and W. B. Wood.—p. 65.
Conservative Treatment of Laryngeal Diphtheria. J. H. Clarke.—p. 66.
Thrombosis of Axillary Vein. M. C. Oldfield and L. N. Pyrah.—p. 68.
Acetylcholine in Tobacco Amblyopia. H. C. Orr.—p. 69.

Mirror Test in Pulmonary Tuberculosis.—Cohen and Wood think that the test should, when possible, be carried out in the early morning. The patient and examiner sit as for ordinary indirect laryngoscopy, and a large size mirror—for example, No. 6—is held with its surface horizontally above the larynx. The patient is instructed to give several short barking coughs, and the mirror is thus sprayed with bronchial secretion. It is then withdrawn along the roof of the mouth, care being taken to avoid brushing its surface against the tongue. Flecks of yellowish secretion of pin-head size are characteristic though not typical of tuberculous expectoration. Mucoid or watery secretion usually but not invariably yields a negative result. The flat of the mirror is now applied to one end of a slide and drawn along it, leaving a thin film which is dried and stained in the usual manner. The possibility that the slide may be contaminated when the mirror has been used in a previous test is remote, but careful sterilization of the mirrors is essential. Dr. Hebert has suggested to the authors that the use of the all-metal mirrors now sometimes employed for indirect laryngoscopy might be a useful safeguard. On the basis of their experiences with this test the authors reach the following conclusions: 1. The examination of secretion ejected directly from the lungs and collected by a mirror held over the larynx is a quick and convenient method of demonstrating tubercle bacilli. 2. The mirror test frequently enables the confirmation of a diagnosis of pulmonary tuberculosis suggested by history, symptoms or physical signs to be made without the delay that must occur when the patient is given a sputum outfit. Difficulties in securing the return of sputum flasks by mail are obviated. This advantage will be especially appreciated by those who work in country districts or among uncivilized communities. 3. Malingering may be circumvented and the patient who consciously or unconsciously swallows his sputum may be induced to supply a sample of pulmonary expectoration by this means. 4. Compared with the ordinary sputum test the mirror test, to judge from this limited experience, is more delicate, and it may enable such accessory methods of examination as gastric lavage and bacterial investigation of the stools to be dispensed with. Though less delicate than the sputum concentration test, it can be used when no sputum is available for that purpose.

Journal of Physiology, London

87: 97-198 (July 21) 1936

Oxygen Transport of Fetal and Maternal Blood During Pregnancy. R. G. Leibson, I. I. Likhnitsky and M. G. Sax.—p. 97.
Formation of Glycogen in Liver of Anesthetized Cats, with Notes on Specific Dynamic Action. C. Reid.—p. 113.
Insulin and Storage of Liver Glycogen in Anesthetized Cats. C. Reid.—p. 121.
Influence of Salt Saturation on Urinary Response to Pituitary (Posterior Lobe) Extract. K. I. Melville.—p. 129.
Action and Fate of Injected Posterior Pituitary Extracts in Decapitated Cat. A. M. Jones and W. Schlapp.—p. 144.
Electrical Responses of Maia Nerve to Single and Repeated Stimuli. J. Y. Bogue and H. Rosenberg.—p. 158.
Action of Adrenalin on Perfused Liver. J. L. D'Silva.—p. 181.
Some Observations on Denervated Spleen. J. Barcroft and R. H. E. Elliott.—p. 189.

Lancet, London

2: 59-114 (July 11) 1936

*Pulmonary Disease Due to Inhalation of Dust, with Especial Reference to Silicosis. E. L. Middleton.—p. 59.
Etiology of Lymphadenoma: Sensitized Vaccine of Elementary Bodies. M. H. Gordon.—p. 65.
*Acute Alimentary Catarrh in the New-Born. W. S. Craig.—p. 68.
Pernicious Anemia Followed by Carcinoma of Stomach. S. Silverman. —p. 71.
Adenocarcinoma of Stomach and Hyperchromic Anemia. N. G. Hulbert. —p. 74.
Resection of Lower Esophagus and Cardia. E. G. Muir.—p. 75.

Pulmonary Disease Due to Inhalation of Dust.—Middleton discusses the disorders that develop in workers with asbestos, sillimanite, China clay, talc and French chalk, mica and sericite. Certain conclusions regarding the etiology of silicosis may be drawn from the consideration of the occupations in which the disease occurs. Where silicosis has been caused, exposure to the inhalation of silica in the uncombined state appears to have been present. With a dust cloud of moderate concentration, the disease develops slowly and the nodules of fibrous tissue appear at certain situations in the lungs. This occurs in grinders of metal, workers on sandstone and pottery workers. When the dust contains a very high proportion of free silica in a fine state of division, and the concentration of particles in the atmosphere is high, the disease tends to develop rapidly. In such cases the fibrosis retains the nodular form and develops at the usual sites, but it appears also in other parts of the structure of the lungs. This has been seen in flint grinding, sand blasting and abrasive soap manufacture. When the rust of free silica is inhaled mixed with certain other kinds of dust in important amount, the arrangement and distribution of the resulting fibrous tissue may be modified. Such modifications have been found in workers in coal and hematite mines. When the inhaled dust consists of silica combined with bases, as silicates, some degree of change in the pulmonary tissue appears to result. In this respect asbestos dust is unique among silicates in the prevalence and severity of the disease which it causes. The physical form of asbestos differs from that of all other industrial dusts. The fibrosis produced in the lungs by the action of silicates differs from that produced by free silica, and the types can be distinguished by radiologic and histologic means. In certain states of the lungs, for example in the presence of tuberculosis, the action of silicates may be modified.

Acute Alimentary Catarrh in New-Born.—Craig shows that there is still doubt about the relative importance of infection and disturbed metabolism as causes of the diarrheas of infancy. In the Royal Maternity Hospital, Edinburgh, over a period of three and one-half years, there were forty-one cases of infants developing symptoms of severe gastro-intestinal disturbance. Of these, seventeen occurred in minor epidemic form. An imporant feature was the frequency with which symptoms appeared in infants healthy at birth. There were eleven fatal cases. The term acute alimentary catarrh has been applied to the cases under discussion, as it indicates primary involvement of the gastro-intestinal tract by an acute catarrhal condition, irrespective of its inflammatory nature. There was an unmistakable similarity in these cases. Signs of mild dyspepsia appeared within forty-eight to seventy-two hours of the first introduction of cow's milk into the feeds; the infant became listless, the appetite less keen, and weight progress slower. The condition remained unchanged for one or two days. The stools then became increasingly loose and eventually watery in consistency and foul smelling. The stools were green or brown. Evacuations numbered from five to twelve in the day. Fever quickly followed the onset of diarrhea; it rarely exceeded 101 F., was irregular in character and fell by lysis. A progressive decline in weight commenced; vomiting once or twice in the day was common. Evidence of dehydration and toxic absorption was soon apparent. Weakness increased daily. In fatal cases death came gradually and was preceded by a period of semicoma. In those who recovered a return of the temperature to normal was the first evidence of improvement; it was followed by diminution in the number of stools and a readiness to take weak milk mixtures. With the appearance of loose stools and fever, milk feeds were discontinued, and fluids given by mouth were limited to sweetened water and weak tea. Rectal salines were employed in only a limited number of cases; they were seldom retained and tended to aggravate any inflammation of the lower bowel. Parenteral administration of a 5 per cent dextrose-saline solution proved invaluable and was adopted as a routine. Daily subcutaneous injections of from 30 to 50 cc. were given; the interval was lengthened as fluid intake by mouth was increased. In the children in whom vomiting was distressing, improvement followed the removal of mucus by a single gastric lavage. In others, similar improvement resulted from the oral administration of 2 grains (0.13 Gm.) of sodium bicarbonate before feedings. Considerable benefit resulted from gentle washing out of the lower bowel when the motions were fetid or contained mucus. Liquid petrolatum (4 drachms, or 15 cc.) left in the rectum lessened the pain of defecation and the risk of excoriated buttocks. Petroleum emulsion (one-half drachm, or 2 cc.) and 2 minims (0.12 cc.) of castor oil were given in mixture form three or four times daily. Brandy in small doses proved the most suitable stimulant. An attempt to reintroduce milk was made after the temperature had become normal. Prevention depends on removing risks of infection and on avoiding minor disturbances of digestion. Observations made in the present series suggest that the path of alimentary infection is often by the mouth. The view is held that the condition is primarily a result of infection. It rarely occurs in breast-fed infants. Intestinal catarrh resulting from digestive disturbance is an important factor favoring alimentary infection, and acute catarrhal conditions of the alimentary tract in the neonatal period may be responsible for dyspepsia in later infancy and early childhood.

Medical Journal of Australia, Sydney

1: 867-896 (June 27) 1936

Whooping Cough: Etiology and Treatment. S. W. Williams.—p. 867.
Differential Diagnosis of Organic and Functional Nervous Diseases. W. S. Dawson.—p. 871.
When Is Catgut Sterile? T. H. Small.—p. 878.
*Results of Short Wave Therapy. K. R. Speeding.—p. 881.

Results of Short Wave Therapy.—Speeding points out that the short wave type of diathermy has not yet become universally recognized, for many regard it as being identical with the older (or long wave) diathermy. The result is that it is credited with only a limited field of application and that many patients who would benefit considerably from the therapy are treated by other methods on the assumption that the contraindications are the same as those of long wave diathermy. A brief description of the results of short wave therapy in twenty-five cases is given. The first patient had a variety of neuropathy together with moderately advanced rheumatoid arthritis, mucous colitis, vasopharyngeal catarrh and purulent tonsillitis. Instructive features of the case include the tonsillar reaction, suggesting that the therapy may be of value in many of these conditions, and the improvement of the catarrh. Among other conditions in which the author resorted to the short wave therapy were pelvic peritonitis, supra-orbital neuralgia, psoriasis, chronic inflammation of the semilunar bone, bleb formation over the base of the great toe, furunculosis of the leg, chronic mucosal thickening of both antrums, pansinusitis, hay fever, rheumatoid arthritis, monarticular osteo-arthritis, spondylitis, asthma, pulmonary fibrosis, periduodenitis, otosclerosis, periarticular inflammation, synovitis and paronychia. In discussing the technic the author says that the short wavelength (6 meters or less) was not found to have any special value, so a longer one (24 meters, approximately) was adopted and appeared to be quite suitable for practically all purposes. One of the valve types of apparatus was used for the work, as the spark gap machine was not considered to be efficient enough, especially when depth effect was particularly desired. Many different types of electrode were investigated. For general use the pad was found to be satisfactory. Its insulation may be composed of cloth surrounded by rubber, thus avoiding any likelihood of electrical shock and the possibility of any deep seated burn. For the majority of diseases a time of approximately ten minutes or less is suitable for the initial application. The dosage may be steadily increased after this, but it is not considered advisable to allow the production of any reaction that is more than

temporary in its nature. In estimating the effects of the treatment one is impressed with the fact that in many conditions the response is poor, while in others the improvement is rapid and persistent. Thus it is obvious that short wave therapy cannot be regarded as a universal cure. But it is equally obvious that the indications for its use in certain cases are pronounced, and the ease of application combined with the freedom from any harmful results should commend the method both to the physician and to the patient. The advantages of roentgenologic control are mentioned.

Presse Médicale, Paris

44: 1145-1160 (July 15) 1936

Infectious Neoplasms of Rabbit. A. Béclère.—p. 1145.
*Study of Variations of Blood Cholesterol. M. Lévy and L. Gally. —p. 1147.

Study of Variations of Blood Cholesterol.—Lévy and Gally studied the blood cholesterol of patients suffering from hyperthyroidism during the course of treatment with roentgen rays. They believe that the level of blood cholesterol in patients having hyperthyroidism is as important as the clinical course and the basal metabolic rate. Thus, for example, the rapid and ample increase in the level of the blood cholesterol accompanying the clinical signs of improvement and the tendency toward the return to normal of the basal metabolic rate can indicate the discontinuance of further roentgen treatments of a thyroid gland. Similarly, when roentgen treatment is unsatisfactory, an early and rapid demonstration of this fact can be made with the aid of cholesterol determination.

Revue Française de Pédiatrie, Paris

12: 317-452 (No. 3) 1936

Meningeal Hemorrhage in the New-Born. B. Tassovatz.—p. 317.
Cholecystitis in Children. Zelditch, Wurmann, Jolkver and Guinditch. —p. 351.
*Attempted Treatment of Thrombopenic Purpura by Phenylhydrazine. A. Wallgren.—p. 370.
Habitus and Constitution in Childhood and Adolescence. E. Schlesinger. —p. 385.
Milk as Source of Vitamin C. E. Stoerr.—p. 427.

Treatment of Thrombopenic Purpura by Phenylhydrazine.—Wallgren observed four cases of purpura treated with phenylhydrazine, and the reactions differed widely. In most instances there was a considerable increase in the number of platelets accompanying the first administration of phenylhydrazine. This increase in platelets might or might not be associated with improvement in frequency and severity of hemorrhages. Cumulative effects were observed. It was also noted that a solution of phenylhydrazine rapidly loses its effectiveness, and therefore a freshly prepared solution should be used each time. In general the hemolytic effects of phenylhydrazine appear earlier than its irritative action on the osseous tissues (notably the multiplication of platelets). Therefore the increase in the number of platelets is almost always accompanied by a decrease in the number of erythrocytes. With the results of phenylhydrazine on this type of purpura so uncertain and the likelihood of producing hemolysis and anemia, the author believes that this medication should not be employed in the treatment of thrombopenic purpura.

Sang, Paris

10: 789-896 (No. 7) 1936

Gaucher's Disease in Adult: Case. P. Merklen, Mlle. G. Hoerner and J. Warter.—p. 789.
Megakaryocytic Myeloid Splenomegaly: Case. P. Émile-Weil, P. Isch-Wall, S. Perlès and Scemama.—p. 797.
New Information on Action Mechanism of Blood Transfusion. N. Feodorof, K. Barouline and Mme. A. Namiatichef.—p. 815.
*Studies on Reticulocyte Behavior in Typhoid. B. Jochweds and A. Sztejnberg.—p. 833.

Reticulocytes in Typhoid.—Jochweds and Sztejnberg attempted to study the function of the osseous medulla in typhoid by observing the behavior of the reticulocytes in the peripheral blood. Sixty-one patients (thirty-three males and twenty-eight females), ranging in age from 14 to 50 years, were thus observed. During the second and third weeks of the typhoid the reticulocytes were below 3 per thousand in 73 per cent of the cases; in the others they oscillated between 3 and 9 per thousand. The level was not much increased in the fourth and fifth weeks and it was not until the following weeks that a notable augmentation of reticulocytosis, from 7 to 26 per thousand, was noted. The common stimulants of the osseous tissue, such as hemorrhages, injections of horse serum, liver extracts and blood transfusions, produced a rapid and lasting increase in the number of reticulocytes. This fact suggests an inhibition of the osseous tissue rather than a complete suppression. Furthermore, reticulocytosis was markedly diminished in relapses of typhoid.

Schweizerische medizinische Wochenschrift, Basel

66: 797-816 (Aug. 22) 1936. Partial Index

Ischialgias. E. Stotzer.—p. 797.
*Experiences with Permanent Suction Drainage of Duodenum in Ileus and Peritonitis. R. Howald.—p. 799.
Research on Action of Sedatives of Sympathetic Nervous System in the Clinic. M. Monnier and J. Sterne.—p. 801.
Progress in Experimental Cancer Research. K. Ullmann.—p. 803.

Experiences with Permanent Suction Drainage.—Howald shows that in ileus the gastric stasis is generally counteracted by lavage of the stomach. This method, although giving considerable relief in ileus as well as in peritonitis, has the disadvantage that its efficacy is of only short duration. In order to make the effect of this treatment more lasting, permanent gastric drainage by means of the usually introduced tube has been tried. The author points out that, whereas in German clinics the permanent gastric drainage is usually employed in peritonitis and in postoperative disturbances in the intestinal passage, some American clinics resort to this method also in the nonperitonitic forms of ileus, passing the tube down into the duodenum. In describing the method, he says that at his clinic in Basel the treatment is done with Pratt's modification of Wangensteen's apparatus. By the continuous suction, the stomach and the upper portions of the small intestine are gradually evacuated. Corresponding to the antiperistaltic waves of the small intestine in ileus, the evacuation takes place at intervals. Suction drainage is most effective in simple ileus of the small intestine, particularly when it is acute and incomplete; that is, in all conditions in which otherwise a fistula of the small intestine is made. Moreover, the method can be used with hope for success also in subacute ileus and in other intestinal obstructions, be they in the small intestine or in the colon. The author cites the histories of two cases in which beginning ileus could be counteracted by suction drainage alone. The method is helpful also in the later stages of ileus, as preparation for the operation, because the suction drainage not only effects a mechanical relief but also has a detoxicating effect. To be sure, it is necessary to keep the patient under careful observation, and, if there are signs of strangulation with a disturbance in the blood perfusion of a portion of the intestine, the operation cannot be postponed. On the basis of additional case reports, the author shows that permanent suction drainage is helpful also in postoperative intestinal atony and in all peritonitic conditions, particularly in cases of perforated appendicitis. In order to prevent dehydration in patients undergoing suction drainage, fluids must be administered by the parenteral route (at least 3,000 cc. within twenty-four hours). To counteract the depletion of the chlorides, physiologic solution of sodium chloride or Ringer's solution should be infused. In addition to this, 5 per cent solution of dextrose should be given. In peritonitic conditions, opiates should be prescribed in order to inhibit peristalsis. Hot compresses on the abdomen are advisable, particularly in inflammatory conditions. The author says that recently suction drainage of several days' duration has been recommended also in preparing patients with gastric ulcer or carcinoma for the operation.

Policlinico, Rome

43: 1555-1590 (Aug. 31) 1936. Practical Section

Adrenal Medullectomy in Syndromes Due to Hyperfunction of Adrenal Medulla. L. Durante.—p. 1555.
*Malarial Splenomegaly in Children: Treatment by Maurizio Ascoli's Method. F. Jerace.—p. 1562.

Malarial Splenomegaly in Children.—Jerace obtained satisfactory results from intravenous injections of from 0.01 to 0.1 mg. of epinephrine in children, ranging in age from 2 to 10

years, who were suffering from chronic malarial splenomegaly. The treatment is well tolerated by the patients. The volume of the spleen rapidly decreases and the crasis of the blood improves. The author believes that the method is indicated in chronic malaria and its sequels and also in acute malaria by combining the epinephrine injections with specific antimalarial drugs.

Archivos Argentinos de Pediatria, Buenos Aires

7: 429-504 (July) 1936

Frequency of Meningeal Forms in Acute Anterior Poliomyelitis: Their Importance in Diagnosis of Preparalytic Period; Epidemic in Buenos Aires. R. Cibils Aguirre and J. L. Araoz.—p. 443.
*Estrogen in Treatment of Gonorrheal Vulvovaginitis in Little Girls. F. Escardó and J. Salzman.—p. 460.
Clinical Picture of Acute Anterior Poliomyelitis in Infants: Epidemic in Buenos Aires. M. J. del Carril, J. Vidal and B. Paz.—p. 474.
Roentgen Examination of Skeleton in Diagnosis of Congenital Syphilis in Infants. P. R. Cervini and G. A. Bogani.—p. 480.

Estrogen in Treatment of Gonorrheal Vulvovaginitis.—Escardó and Salzman review the literature on the development of endocrine therapy and consider the indications for administration of estrogen, the safety of the treatment and the doses, routes of administration and mechanism of action of estrogen in vaginal infections. They report the results of the treatment in gonorrheal vulvovaginitis in girls ranging in age from 2 to 10 years. The treatment was successful in seven of the eight patients treated. The authors conclude that gonorrheal vulvovaginitis in little girls is controlled by the beneficial effect of estrogen on the infantile vulvovaginal mucosa. The dose should be determined in each case by the reaction of the mucosa to the estrogen. The mucosal reaction is verified by making periodic bacteriologic and cytologic examinations of the mucosal tissues in vaginal smears. Oral administration is easier than that of other methods, but the results are good by either route. The general effect of estrogen on the organism of the patient seems to be harmless. The method is in the experimental phase. True conclusions as to its value and effects will result only from prolonged studies in a large number of cases. Gonorrheal vulvovaginitis in small girls has been resistant to the several treatments used in the past. The estrogen treatment seems promising.

Prensa Médica Argentina, Buenos Aires

23: 1831-1884 (Aug. 5) 1936

*Recurrent Benign Spontaneous Pneumothorax. M. R. Castex and E. S. Mazzei.—p. 1831.
H Units in Comparison with International r Units. E. L. Lanari and F. Vierheller.—p. 1849.
Castellani Spirochetosis with Esophageal Localization: Case. D. Boccia, R. Becco and C. Salvo.—p. 1854.
Roentgen Image of Pathologic Mastoid. M. Arce and F. Arce.—p. 1858.

Recurrent Benign Spontaneous Pneumothorax.—Castex and Mazzei summarize the cases of recurrent benign spontaneous pneumothorax reported in the literature up to the present time and report three cases seen in their practice in a group of twenty cases of benign spontaneous pneumothorax. The condition develops with preference in young men. The symptoms are those of nonrecurrent benign spontaneous pneumothorax. It is the result of the tearing of so-called subpleural blebs, the rupture of which is caused by an exaggerated pressure during an effort. The subpleural blebs form themselves mechanically, at the level of the weaker or slightly altered areas of the lung, at the time of gaseous overdistention at that level. This interpretation is supported by the data given by the roentgen and anatomopathologic studies of the lung in this condition as well as by results of experiments. In all cases of benign spontaneous pneumothorax it is advisable to investigate, by means of the roentgen study of the lung, the presence of fine ring shadows at the contours of the visceral pleura, which represent subpleural blebs located at that level. In the roentgenograms of the lung of one of the authors' patients, who was suffering from recurrent benign spontaneous pneumothorax, the shadows given by the subpleural blebs were evident in all the consecutive roentgenograms. The prognosis and treatment of the condition are the same as those of nonrecurrent benign spontaneous pneumothorax.

23: 1885-1936 (Aug. 12) 1936

Obstetrics, Gynecology and Surgery. A. Peralta Ramos.—p. 1885.
Visceral Block from Thorium Dioxide in Roentgen Examination of Viscera. E. L. Lanari, M. E. Jorg and J. A. Aguirre.—p. 1890.
*Results of Specific Serotherapy in Multiple Sclerosis. J. E. Carulla and H. Zunino.—p. 1896.
Treatment of Gonorrheal Arthritis by Regional Vaccination. O. L. Gómez and F. Basch.—p. 1900.
Cavernous Sinus and Oculodental Venous Connections. L. E. Longinotti.—p. 1905.

Results of Specific Serotherapy in Multiple Sclerosis.—The treatment used by Carulla and Zunino consists in weekly subcutaneous injections of from 2 to 3 cc. of hemolytic serum of rabbits previously immunized with the blood of the patients. The authors report results in three cases, in one of which the evolution of the disease has been controlled for more than three years. In this case the discontinuation of the treatment for three months, after a year and a half, resulted in recurrence of the disease, which was controlled by further treatment. The best results are obtained when the treatment is given early, before establishment of grave nervous lesions. It is advisable to give the treatment indefinitely, because its discontinuation generally results in recurrences.

Semana Médica, Buenos Aires

43: 349-416 (Aug. 6) 1936. Partial Index

New Micromethod for Evaluation of Carbon in Organic Compounds. J. A. Sánchez.—p. 360.
*Takata-Ara Reaction in Internal Diseases. D. Boccia and J. A. Gamalero.—p. 365.
Hematoma of Umbilical Cord: Case. D. Berdeal Avila.—p. 368.
Labor in Pulmonary Tuberculosis: Care and Conduction of Cases. Almeida Gouveia.—p. 371.
Pathogenesis of Tuberculosis: Mechanism of Action of Cod Liver Oil. L. L. Silva and R. Cárcamo.—p. 373.
Pregnancy at Full Term Late After Removal of Rectum in Rectal Cancer: Case. J. León and S. L. Sala.—p. 386.

Takata-Ara Reaction in Internal Diseases.—Boccia and Gamalero used the Takata-Ara reaction in several internal diseases. The test gives positive results in all cases of atrophic cirrhosis and neurosyphilis and negative results in liver cirrhosis and several internal diseases of different nature. The results of the test are variable in pathologic processes of the biliary tract and in tuberculosis. In these conditions the test has neither a diagnostic nor a prognostic value. In cancer (whether or not developed in the liver) and in cachexia the results may be positive or negative. The technic of the Takata-Ara reaction is simple. Combined with other similar tests it can be of diagnostic value in certain internal diseases. However, it is not specific. Because of the small number of cases in which the authors have made the test, their article is a preliminary note and their conclusions are not definite, but they are still experimenting.

Folia Haematologica, Leipzig

55: 161-304 (July) 1936. Partial Index

Experimental Studies on Gastrogenic Anemia. S. Petri, A. S. Ohlsen and D. Bøggild.—p. 161.
Cause of Distribution of Leukocytes in Blood Smear: Form of Nucleus of Polymorphonuclear Leukocytes. E. Schill.—p. 175.
*Blood Picture in Chronic Glomerular Nephritis and Genuine Contracted Kidney. B. Misske and W. Otto.—p. 182.
*Atypical Azurophilic Granulation in Megaloblasts. O. P. Jones.—p. 195.
Blood Picture of Human New-Born, with Especial Reference to Lymphocytes. H. Agress and H. Downey.—p. 207.
Clinical Investigations on Size of Erythrocytes and Its Significance for Dermatology. M. A. Schoch.—p. 240.

Blood Picture in Chronic Glomerular Nephritis.—Misske and Otto direct attention to the unusually pale appearance of patients with glomerular nephritis. They observed an anemia in 44 per cent of the cases of chronic glomerular nephritis in which there was no essential disturbance in the renal function. The hemoglobin content was generally about 70 per cent. The number of erythrocytes was on the average around 3.73 millions. As the urea values increased, the anemia became more severe. The same relationship was discovered between the anemia and the rest nitrogen. The increase in the uric acid content of the blood usually preceded the changes in the other blood values and in the degree of anemia. Leukocytosis of a milder degree was observed in 54 per cent of these cases. In the cases of chronic glomerular nephritis that were accompanied by renal insufficiency, anemia had an incidence of

90 per cent. The hemoglobin content was as a rule around 56 per cent, the number of erythrocytes was 3.16 million and the average color index was 0.88. In these patients also an increase in the retention of the urea was accompanied by an exacerbation of the anemia. The highest uric acid values were found in uremia and in cases in which the hemoglobin values were around 50 per cent. The indican reaction became stronger as the anemia increased. The xanthoproteic test showed a behavior similar to that of the indican test. The leukocyte values were increased in 60 per cent of the cases and were never reduced. However, there was no relation between the number of leukocytes and the anemia. In genuine contracted kidney, the transitional cases showed increased hemoglobin and erythrocyte values. Patients with decompensated renal function showed anemia, the development of which was approximately parallel to the retention of the urinary substances. In the patients with anemia, the indican and xanthroproteic reactions were positive in 64 per cent, whereas in those without anemia they were positive in only 21 per cent.

Atypical Azurophilic Granulation in Megaloblasts.—Jones says that during the past several years he has been making an intensive study of the megaloblast normoblast problem. One of the facts that have been stressed constantly in morphologic hematology is that the first developmental stages of the hemoglobiniferous series are always devoid of any type of granulation. Apparently the appearance of granulation in the cytoplasm of hemoglobiniferous cells is rare or else it would have been described before. While this investigation was in progress, Segerdahl reported granulation in the cytoplasm of early megaloblast stages of pernicious anemia bone marrow. Since the author's observations do not coincide with those of Segerdahl and since there is considerable theoretical importance attached to the finding of granules in the cytoplasm of young hemoglobiniferous cells, he believes that an accurate description of the granules should be made and due consideration given to the bearing this observation has on theoretical hematology. He describes his observations and points out that Downey cannot agree with any of the proposed theories, since he finds that azurophilic granulation is not necessary for granulocytic development and maturation. He observed cases of myelogenous leukemia in which the granulocytes are developing from myeloblasts without any azurophilic granulation. The author's observations tend to support Downey's views concerning the significance of azurophilic granulation. Certainly the finding of azurophilic granulation in the early megaloblast stages dispels any concept that they represent a temporary differentiation of the stem cell along granulocytic lines. The presence of azure granules in prophilic and basophilic megaloblasts may be indicative of rapid proliferation and differentiation toward the hemoglobiniferous series, in which case the differentiation may have been so rapid that the azurophilic granules did not have time to disappear before reaching the promegaloblast stage. No such condition exists normally in the normoblastic series, so that their presence must be interpreted as being atypical and pathologic. The collection of azure granule remnants into a juxtanuclear position may be similar to the pathologic alteration of azure granules in the form of Auer bodies. These granules do not appear in the megaloblasts in every case of pernicious anemia. It might be thought that they are due to technic. At any rate, regardless of the obscure mechanism which causes the rare occurrence of these granules in megaloblasts, the finding of azurophilic granules in the early forms of megaloblasts further substantiates the author's observation concerning the origin of the megaloblastic series from the myeloblast in pernicious anemia bone marrow during relapse.

Medizinische Klinik, Berlin

32: 889-920 (July 3) 1936. Partial Index

Cushing's Disease. W. Berblinger.—p. 889.
*Influence of Vitamins A and C on Glycosuria in Diabetes Mellitus. M. Roller.—p. 898.
*Percutaneous Arteriography as Therapeutic Method. A. Beutel and O. Klein.—p. 899.
Scarlet Fever and Angina. F. Schleissner.—p. 902.

Influence of Vitamins A and C on Glycosuria.—Roller studied the influence of vitamins A and C on the glycosuria of patients with diabetes mellitus. His observations on the regulatory effect exerted by these vitamins seem to explain the favorable results that are obtained with certain empirically established diets of the preinsulin era. A reduction of the vitamin A vehicles, such as eggs, butter and cream, and of vegetables that contain vitamin A results in a reduction of the glycosuria or permits the intake of larger quantities of carbohydrate. Moreover, it is known that a diet containing large amounts of protein promotes the action of vitamin A, whereas a diet deficient in vitamin A furthers the development of A avitaminosis. Consequently the restriction of the protein content of the diet signifies a reduction in the vitamin A action, which in turn results in a lessening of the glycosuria. Thus not only the exclusion of the vitamin A vehicles but also a reduction in the proteins permits the intake of greater amounts of carbohydrate without increased glycosuria or insulin requirements. The glycosuria can be still further reduced if the diet provides generous amounts of vitamin C, or if vitamin C is given in the pure form.

Percutaneous Arteriography as Therapeutic Method—Technic.—Beutel and Klein palpate with the finger below the inguinal fold the site of the most intense pulsation of the femoral artery and puncture here at an angle of 45 degrees with an injection needle. At first the injection needle is connected with an empty syringe, but after the arterial wall has been penetrated and the plunger of the empty syringe is moved by the arterial blood stream a 20 cc. injection syringe filled with the warmed contrast medium is attached to the needle. In order to be certain that the point of the needle is actually in the lumen of the artery, some blood is permitted to enter this second injection syringe. Then the entire quantity of the contrast medium is injected in from ten to fifteen seconds. Following the injection, a compression bandage is put on and a sand bag is placed on the site of the puncture. The patient continues to lie down for several hours, and after three or four hours he is usually able to get up again. In some patients as many as thirteen injections were made. The authors cite the history of a typical case and assert that in a number of other cases they obtained similar favorable results. They gained the impression that in some cases the injection treatment will permit a postponement or entirely prevent the amputation of an extremity. In discussing the action mechanism of this treatment, they suggest that the injected substance exerts not merely a mechanical but a pharmacodynamic action on the circulation and the blood perfusion of the vascular region in question. Capillaroscopy disclosed a considerable dilatation of the cutaneous capillaries, and the patients experienced a burning sensation of heat.

Münchener medizinische Wochenschrift, Munich

83: 1079-1118 (July 3) 1936. Partial Index

*Pleurisy During Childhood. H. Vogt.—p. 1079.
Epidemic of Psittacosis. O. Beyreis.—p. 1082.
*Investigations on Pathologic-Anatomic Development of Corrosive Esophagitis in Human Subjects. Markow.—p. 1085.
Unusual Injury of Middle Ear. Hildmann.—p. 1090.

Pleurisy During Childhood.—Vogt says that, if the stasis transudates that occur in all age groups are disregarded, there remain for the period of childhood only two types of pleural disorders, the serous and the suppurating pleurisies. Empyema develops chiefly during the first few years of life, whereas serous pleurisy chiefly attacks children over 5 years of age. Both of these disorders are related to pneumonia. In nearly all cases of pneumonia that react to the pleura, a serous exudate of the pleura develops. To be sure, these serous exudates that accompany practically every pneumonia are usually so slight that they escape detection by the usual methods of examination. Extensive serous exudates are the exception after pneumonia. The so-called idiopathic pleurisies have connections with tuberculosis, for it has been observed that from 30 to 50 per cent of the patients who pass through a serous pleurisy succumb to a progressive tuberculosis within the following four years. However, in children the danger is not so great as in adults. The author considers it justified to refer to idiopathic pleurisy as "paratuberculous" pleurisy but emphasizes that this term indicates only that the disorder develops on the basis of a tuberculosis and is not a tuberculosis of the pleura in the anatomic sense. In the treatment of serous pleurisy, the question regarding the evacuation of the exudate by puncture is of vital impor-

tance. Evacuation becomes necessary as soon as the exudate becomes so extensive that it causes a displacement of the mediastinum with dyspnea and circulatory disturbances. Aside from this, it has not been proved that evacuation shortens the course of the disease. As long as there is still fever, the exudate usually reappears. Following subsidence of the fever, the exudate is usually rapidly absorbed without an intervention. The author warns against too early beginning of the respiratory exercises and too early getting up. The knowledge that serous pleurisies not connected with pneumonia are often related to tuberculosis makes a careful supervision necessary, even after the serous pleurisy has subsided. The author points out that occasionally empyemas of the pleura are observed in new-born infants or in older infants as a partial manifestation of a generalized sepsis or a metastasis of a suppurating inflammation in the abdomen. However, the greatest majority of the pleural empyemas develops in connection with pneumonia. The younger the child, the more often is the empyema a complication of pneumonia. Since lobar pneumonias reach the pleura more frequently, it is understandable that they are more often complicated by empyemas than are bronchopneumonias. Particularly in nursings, the empyema is often masked by the simultaneously existing pneumonia, so that in some cases they fail to be recognized until necropsy. Empyema in young children has a high rate of mortality. Of course, it is often impossible to determine whether the empyema or the accompanying pneumonia caused the death. In discussing the treatment of empyemas, the author says that the mortality rate has been reduced, since it was realized that a resection of ribs or a wide opening of the pleural cavity must be avoided as long as the pneumonia has not completed its course. Avoiding the resection of the ribs during the first stage of the empyema is not identical with a failure to remove the pus from the thorax, for puncture as well as suction may be resorted to. In some cases these measures are adequate for a cure and at least bridge over the time during which resection of ribs would be dangerous.

Corrosive Esophagitis.—Markow made careful observations on the development of corrosive esophagitis, beginning with the first few hours after poisoning with the caustic substance and continuing to the end of the first, second or fifth year. The material consisted of sixty cases. He describes the histologic aspects of acute and chronic corrosive esophagitis, the peculiarities of the reparative process and the macroscopic aspects. He stresses the great variety of the pathologic-anatomic aspects of corrosive esophagitis, not only in the different cases but also during the several stages in the same patient. He found that in many cases the corrosive changes of the esophagus are so superficial that they hardly require local treatment, whereas in other cases they are so deep and extensive and the general intoxication is so severe that local treatment is only a useless torture for the patient. In still others the inflammatory process and the subsequent chronic ulcerations lead to such hard and extensive scars that no improvement can be expected from local treatment.

Zeitschrift für Krebsforschung, Berlin

44: 1-72 (June 18) 1936

Studies on Coagulation of Blood Serum of Healthy Persons and Animals and of Those with Tumors. B. Purjesz.—p. 1.
Statistics on Cancer in Bavaria During 1929. K. Leutheuser.—p. 12.
Studies on Hirszfeld's Reaction: III. Significance of Group Receptors and of Heterogenic Antigen for Outcome of Reaction. A. Zacho. —p. 43.
*Therapeutic Experiments with Vitamin A in Cancer. B. Lustig and H. Wachtel.—p. 53.
Sarcoma of Gallbladder: Case. A. Büttner.—p. 59.
Sarcomas of Heart. H. Rindt and H. Schwarz.—p. 66.

Therapeutic Experiments with Vitamin A in Cancer.—Because their animal experiments had demonstrated that the growth inhibiting action of vitamin A becomes manifest only in epithelioma but not in sarcoma of mice, Lustig and Wachtel limited their therapeutic experiments on human cancers to histologically verified epitheliomas. They used a vitamin A preparation which contains 40,000 biologic units in 1 cc. They apply the vitamin in the form of compresses and subcutaneous injections. If the vitamin is applied in the form of compresses it is used as an emulsion, which is obtained by mixing it with a colloidal copper preparation. In case of subcutaneous injections, 0.4 cc. of the copper colloid and the corresponding dose of vitamin are drawn into the syringe and, without mixing, are injected together. At first the authors treated superficial tumors (cutaneous epitheliomas and mammary carcinomas), applying the vitamin by means of compresses. Under the influence of this treatment the ulcerated surface becomes smaller, new epithelium grows in from the periphery, and the bottom of the ulcer becomes clear. These therapeutic effects were limited to the part of the tumor to which the treatment had been applied, the untreated portions remaining unchanged. Distant metastases likewise remained uninfluenced. But although the vitamin A compresses exerted a favorable effect, a complete cure of the cancerous ulcerations was not obtained until radium treatment was employed. Treatment with vitamin A was found especially helpful in cases in which a torpid ulcer remained after radium treatment. In subcutaneous administration of vitamin A, restriction to a certain dose is necessary in order to avoid the undesirable symptoms of hypervitaminosis. The threshold of tolerance for this mode of administration is between 100,000 and 120,000 biologic units. The authors begin with an injection of 40,000 units and twenty-four hours later inject another 20,000 units. If these injections produce an improvement, a third injection of 20,000 units is made two days later. If this is followed by further betterment, an additional 20,000 units is given three days later. New series of injections should not be given until at least five or six weeks has elapsed. The authors conclude that, although vitamin A fails to effect complete cure of cancer, its palliative action is sufficiently well established to justify its application as an adjuvant to other therapeutic methods.

Wiener klinische Wochenschrift, Vienna

49: 1037-1060 (Aug. 21) 1936. Partial Index

Pathology and Clinical Aspects of Auditory Disturbances in Cerebral Tumors. H. Brunner.—p. 1037.
*Question of Habit Breaking in Drug Addict. P. Weger and C. Amsler. —p. 1040.
Spreading and Prevention of Tuberculosis During Childhood. A. Götzl. —p. 1041.
*Experimental Investigations on Antithyroid Protective Substances of Blood. K. Fellinger and R. Pfleger.—p. 1044.
Treatment of Intermittent Claudication with Aid of Bier's Suction Method. R. Stern.—p. 1045.
*Multiple Osteomyelitic Foci After Typhoid Epidural Abscess Resulting from Osteomyelitic Focus on Cranium. B. Chatzkelson.—p. 1047.

Treatment in Drug Addiction.—Weger and Amsler cite experimental evidence to the effect that in animals morphine addiction can be retarded by the administration of calcium and hastened by chronic intoxication with oxalic acid. They also determined that the breaking of the drug habit can usually be hastened by the administration of calcium. However, in view of occasional failures of calcium medication, it was thought that a deficiency in vitamin D might also play a part and so the authors decided to make further investigations. On the basis of their results, they again recommend the use of calcium in the treatment of drug addiction. They consider the intravenous injection of calcium gluconate the best mode of administration. They also advise supplementing this calcium therapy by measures that promote the vitamin D metabolism (phosphorus, cod liver oil and so on). It is suggested that, in the treatment of addiction to alcohol, calcium-vitamin therapy might likewise be helpful.

Experiments on Antithyroid Protective Substances.—After citing earlier investigations on the antagonism between thyroxine and antithyroid substances, Fellinger and Pfleger describe further experiments. They first determined that the administration of iodine to guinea-pigs stimulates the thyroid of these animals. Their further object was to determine whether this iodine action on the thyroid could be influenced by the antithyroid protective substance that they themselves had obtained from human blood by means of ether extraction. They found that the administration of this substance generally weakened or entirely prevented the activation of the thyroid by means of iodine. Tests on rats likewise revealed an influence of the antithyroid protective substances on the thyroid. The authors conclude that their experiments furnish further support for the assumption that the ether soluble antithyroid substances of the blood have an inhibiting effect on the thyroid. The question whether these substances act on the thyroid directly or by way

of its regulatory mechanism has not been answered as yet; however, the experiments indicate that the antithyroid protective substances influence not only the thyroid hormone but also the gland or its regulatory mechanism.

Multiple Osteomyelitic Foci After Typhoid.—Chatzkelson reports the clinical history of a girl, aged 20, who had abdominal typhoid that necessitated confinement to bed for five months. During this time the patient complained of intermittent pains in both legs. When she got up she complained of continuous severe pains in the lower third of the right leg, where a swelling had developed. Roentgenoscopy disclosed several osteomyelitic foci along the tibia. An operation was performed and after that the patient felt improved. However, less than four months later the patient was again hospitalized on account of pain and swelling in the right temporal region. An osteomyelitic process of the frontal bone was thought of and roentgenoscopy corroborated this diagnosis. On the following day an operation was performed and it was found that the osteomyelitic process had caused an epidural abscess. The patient recovered. In order to prevent a renewed flare up of osteomyelitic foci, the author decided to try blood transfusion. The first transfusion caused extremely severe reactions and the patient had to undergo two other surgical interventions for the treatment of osteomyelitic foci. Then further blood transfusions were tried, the reactions from them being milder each time. Whether these additional blood transfusions will prevent the flare up of other osteomyelitic processes cannot be stated as yet.

Polska Gazeta Lekarska, Lwów

15: 657-676 (Aug. 23) 1936

Gaucher's Disease. H. Kryszek and J. Fajwlewicz.—p. 657.
Cyanosis and Polyglobulism in Pulmonary Tuberculosis and Contemporaneous Disorders of Gaseous Exchange of Lungs and Tissues. A. Landau, A. Pruszczyński and B. Glass.—p. 661.
*Differential Diagnostic Value of Symptoms During Course of Liver Diseases. A. Steinhardt.—p. 664.
Hypertension from Point of View of Social Position. W. Łuczyński.—p. 665.

Diagnostic Value of Symptoms in Liver Diseases.—Steinhardt calls attention to the value of the symptoms of palate discoloration in the diagnosis of diseases of the liver. In the first stage the discoloration is oval and of about the size of a large bean on each side of the median line. In the second stage there is complete discoloration of both sides of the soft palate, it being pale, dimly yellowish and diffuse. This color signifies a subacute condition of the disease. In the third stage the yellow is still darker and dimly reddish. These three stages point to a disease of the liver and associated organs, such as the heart and lungs. In chronic diseases of the liver the symptom is not so important, but in acute stages of any other disease the sudden appearance of this symptom is alarming. In a case of pneumonia, which progressed normally, the sudden appearance of palate symptoms made the author change the routine of treatment. The disappearance of the symptoms served as a sign that the patient was on the road to improvement. In short, the appearance on the soft palate of the yellowish discoloration in three stages may serve as a warning symptom and have an important meaning for the differential diagnosis and prognosis.

Sovetskiy Vrachebnyy Zhurnal, Leningrad

June 15, 1936 (No. 11) pp. 801-880. Partial Index

*Parenteral Administration of Salt Solutions as Method of Nonspecific Therapy. K. I. Kotelnikov.—p. 805.
Symptoms and Treatment of Disturbances of Coronary Vessels. Ya. Yu. Shpirt.—p. 813.
Treatment of Scabies with Sodium Thiosulfate and Hydrochloric Acid. D. A. Lapyshev.—p. 820.
Sterilized Milk-Bacillus Coli Culture Therapy of Dysentery. I. Kh. Chireykin.—p. 826.
Heliotherapy with Calcium Iontophoresis as Curative Factor in Spa Treatment. L. D. Goldenberg and A. K. Bobkov.—p. 829.
Blood Transfusion in Hemorrhages of Abdominal Typhus. A. T. Balmagya.—p. 834.
Hemorrhages in Spotted Typhus Encephalitis. E. Ya. Latsinik.—p. 840.

Parenteral Administration of Salt Solutions.—Kotelnikov injected subcutaneously from 1 to 2 cc. of a weak solution of sodium chloride (from 1 to 2 per cent) in a number of patients suffering from both general and local manifestations. Particularly good results were obtained in acute and subacute local disturbances, such as myositis, causalgia, radiculitis and the various neuralgias. In patients having polyarthritis, this treatment brought about a prompt diminution of pain, improvement in the movement of the involved joints, a better appetite and an improved general state. The author believes that the beneficial effect is due to the cumulative stimulation of the nervous system.

Finska Läkaresällskapets Handlingar, Helsingfors

79: 485-578 (June) 1935

Occurrence of Epidemic Hepatitis in Finland. J. Wickström.—p. 485.
*Epidemiology of Epidemic Hepatitis. J. Wickström.—p. 499.
Changed Physical Characteristics in Plasma Proteins in Nephrosis. M. C. Ehrström.—p. 541.
Blood Sugar Curve in Water Tolerance Test. P.-O. Buch.—p. 557.

Epidemic Hepatitis.—Wickström concludes that epidemic hepatitis is a specific infectious disease. From 1932 to 1935 it occurred in eastern Nyland with varying intensity, with a morbidity of up to 58.4 per cent. During the epidemic the contagion index was considerably increased, owing presumably to increase in virulence. Several cases in the same family were common. In some schools the morbidity rose to 43.2 per cent. The infection is thought to have been transferred mainly from person to person. The period of incubation is usually from three to five weeks. There are seasonal variations as in droplet infection, with maximum in December and February. Those who have had the disease apparently acquire immunity.

Ugeskrift for Læger, Copenhagen

98: 721-754 (Aug. 6) 1936

Constipation. Kramer-Petersen.—p. 721.
Springtime Tired Feeling. H. Tvedegaard.—p. 723.
Ernst Loewenstein Problem. O. Thomsen.—p. 724.
*Acute Myocarditis. H. Kjærgaard.—p. 732.
Epinephrine Reaction in Hemolytic Jaundice and Other Forms of Anemia, Together with Investigations on Changes in Blood Following Splenectomy in Hemolytic Jaundice. A. B. Hansen.—p. 739.
Anomaly of Ribs in Patient with Collapse of Lung After Hemorrhage. H. Harpoth.—p. 745.

Acute Myocarditis.—Kjærgaard reports ten cases of acute myocarditis which did not originate as complications in inflammatory rheumatism, diphtheria or sepsis. In one of the six cases connected with ordinary croupous pneumonia, in a man aged 57, transient atrial flutter, shown by electrocardiogram, was successfully treated with digitalis. In the second case, with perhaps more grave myocardial disturbance, treatment with digitalis was ineffective. In the next three cases, of milder pneumonia, without arrhythmia, the myocarditis was discovered on electrocardiography. In the sixth instance, in a man aged 32 who died from bilateral croupous pneumonia, the electrocardiogram was normal but microscopic examination of the heart revealed acute myocarditis. In one of four cases of apparently primary myocarditis, in patients ranging in age from 26 to 36, the myocarditis proved to be the first clinical sign of a rheumatic infection, in the second it was due to an overlooked typhoid together with later streptococcic infection, and in the last two cases, both fatal, no cause other than general nonspecific infection was found in life or on necropsy. The author stresses the significance of electrocardiography in patients who have had even a slight infection and feel short of breath; he asserts that the postmortem establishment of acute myocarditis in spite of a normal electrocardiogram emphasizes the importance of a long period for convalescence after pneumonia and that an abnormal electrocardiogram in a convalescent always indicates rest in bed and a longer time for convalescing, particularly if the patient does hard labor. The course of these acute myocarditides is always protracted, even the milder cases requiring three months for recovery. Some cases now diagnosed as idiopathic hypertrophy are thought to depend on earlier acute myocarditis, and most of the cases of chronic myocardial degeneration seen in younger persons to be the result of overlooked acute myocarditis. The prognosis is always doubtful. Since acute myocarditis may be the first sign of a specific rheumatic disorder, careful salicylate treatment is advocated in all etiologically doubtful cases. Digitalis is generally believed to have only a slight or even a harmful effect in acute myocarditis. The success of treatment depends on early recognition, long rest in bed and continued control.